

VOLUME ONE/NUMBER ONE/ \$150 (ARC)

PM451

# Vertex

THE MAGAZINE OF SCIENCE FICTION

**MIND CONTROL DEVICES**  
**• HEINLEIN ON SCIENCE**  
**FICTION • THE FUTURE OF**  
**ORGAN TRANSPLANTS •**  
**THEORY AND PRACTICE**  
**OF TIME TRAVEL •**

**Ray Bradbury**  
**Robert Silverberg**  
**Larry Holden**  
**Harry Harrison**  
**Larry Niven**  
**Herman Wrede**



**Gregory Benford**  
**Ed Bryant**  
**Terry Carr**  
**Harlan Ellison**  
**William Rotsler**  
**Forry Ackerman**

# The Flight of Apollo Eleven

Neil Armstrong—Michael Collins  
Edwin Aldrin

Here Men From The Planet Earth  
First Set Foot Upon The Moon  
July 1969, A.D.  
WE CAME IN PEACE FOR ALL MANKIND



"This is Apollo Saturn launch control, 4 minutes and counting. We are GO for Apollo 11. Launch Operations Manager Paul Donnelly wished the crew, on the launch team's behalf, Good Luck and God Speed. We will be coming up on the automatic sequence about ten or fifteen seconds from this time. Neil Armstrong reported back when he received the good wishes "Thank you very much. We know it will be a good flight." Firing command coming in now—we are on the automatic sequence. T-minus three minutes and counting. . . . T-minus three. We are GO with all elements of the mission at this time. We're on an automatic sequence as the master computer supervises hundreds of events occurring over these last few minutes. T-minus 2 minutes 45 seconds and counting. The members of the launch team here in the control center are monitoring a number of what we call red-line values. These are tolerances we don't want to go above and below in temperatures and pressures. They are standing by to call out any deviations from our plans. 2 minutes 30 seconds and counting. We are still GO on Apollo 11 at this time. The vehicle is starting to pressurize as far as the propellant tanks are concerned and all is still GO as we monitor our status boards. 2 minutes 10 seconds and counting. The target for the Apollo

11 astronauts, the moon, at liftoff will be at a distance of 218,096 miles away. We just passed the two minutes mark in our countdown—T-minus 1 minute 54 seconds and counting. Our status board indicates that the oxidizer tanks in the second and third stages have now pressurized. T-minus 1 minute 35 seconds. All indications are coming into the control center at this time indicate we are GO. 1 minute 25 seconds and counting. Our status board indicates the third stage completely pressurized. The eighty second mark has now been passed. We'll go on full internal power at the fifty second mark in the countdown. Guidance system goes on internal at seventeen seconds, leading up to the ignition sequence at eight-point-nine seconds. We are GO for Apollo 11. The Apollo mission: The flight to land the first men on the moon. T-minus 15 seconds. Guidance is internal. Twelve, eleven, ten, nine, ignition sequence start, six, five, four, three, two, one, zero—all engines running. Liftoff! We have a liftoff! Thirty-two minutes past the hour. Liftoff on Apollo 11.

HOUSTON, APOLLO ELEVEN. THAT SATURN GAVE US A MAGNIFICENT RIDE.

Ah, roger, eleven. We'll pass that on and

it kinda looks like you're well on your way now.

HOUSTON. EAGLE UNDOCKED.

Roger. How does it look?

THE EAGLE HAS WINGS.

Eagle. Houston. You're go for PDI. Over.

ROGER UNDERSTAND

WE'RE GO. HANG TIGHT. WE'RE GO. SIXTY SECONDS. LIGHTS ON. THREE FEET DOWN—TWO AND A HALF. KICKING UP SOME DUST. THREE FEET—TWO AND A HALF DOWN. FAINT SHADOW. FOUR FORWARD. FOUR FORWARD. DRIFTING TO THE RIGHT A LITTLE.

Thirty seconds.

CONTACT LIGHT. OKAY, ENGINE STOP, APAN TO DETENT, ENGINE COMMAND OVERRIDE OFF, ENGINE ARM OFF, 413 IS IN.

We copy you down, Eagle.

HOUSTON, TRANQUILITY BASE HERE. THE EAGLE HAS LANDED! O

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time you open  
a bottle of  
J&B Rare Scotch.

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**T**he editorial in a magazine is usually the place where the editor sounds off with his own views about whatever is bugging (or pleasing) him at that particular time. This—the first—editorial in VERTEX is going to be a little different, because the editor (me) is going to sound off about some other people, some of whom you will know, some of whom will probably be complete strangers to you.

No magazine is a one-man project. I'm sure you've all read those long, and exceedingly boring, comments in the front of books about "sincere appreciation is due to . . . for their help and support on this book." Well, boring those comments might be, but they are honest. In a book, or a magazine, there are always people who give unstintingly of themselves, who make the book or magazine a reality, and who are never mentioned except, sometimes, in that little foreword. The editor's (or author's) name is up there in bold print, while all the people who helped him are forgotten.

Now, I don't want to bore anyone, but I do want to thank some people. First, though, let me give you some idea of how VERTEX happened. Back several months ago, I mentioned to my publisher (I also edit other magazines) that it sure would be nice if we could put out a good science fiction magazine—like no other magazine on the stands. A real slick, quality product. This was at the time of the Los Angeles Science Fiction Convention, which is what gave me the idea. It was said more as a joke than anything else, since science fiction magazines don't exactly set the world on fire, sales-wise. It was a wistful joke, though—I've been one of those "science fiction nuts" ever since I happened across a copy of *Planet Stories* 'way back in the early fifties.

A week later my publisher came back and told me that my editorial deadline was 33 days away, that VERTEX was "go" if I could get it done in time to fit it into the schedule. Instant panic! One month to find the material for, design and produce a totally new magazine. By the book, it's impossible. Some S-F people I talked to said it couldn't be done. But, with lots of help, it was done. You're reading the product of those 33 days, right now.

Bill Rotsler immediately became the unpaid art coordinator and walking phone directory for the editor, Forry Ackerman. Mr. Science Fiction, found me material, names and addresses, and provided some much-needed moral support that I don't think he even realized he was giving. Alicia Austin, who is responsible for several of the illustrations in this issue, managed to turn out artwork on a rush basis that is more than just illustrative art—it is ART. Paul Turner climbed out of bed—with a fever of 106—to transcribe the tape of the interview he and Dorothy Simon had done with Ray Bradbury. Bradbury took time from his busy schedule (he was in the hectic pre-production days of his new play, "Leviathan 99") to give us the interview. Charles and Dena Brown, through their fanzine "Locust," put me in touch with many authors who have contributed literally stacks of excellent material. Monte Rogers produced illustrations on a crash basis, while he, Bill Wright and Albar Genesta handled the excellent lay-out on the magazine, following the design and direction of one of the best art directors in the country, Andrew Furr. Kathy Arnold and Elaine Stanton handled, respectively, the advertising and all those nagging little details that give editors ulcers, and Steve Ross did an outstanding job of making sure that all the periods and commas were in the right places. To all these people—thank you. This is your magazine, too. I hope that I have done justice to your efforts.

*Donald J. Pfeil*

Don Pfeil, Editor

# NEWS & REVIEWS

News notes from the world of science and the arts—from space to the prehistoric past—From business contracts to book reviews—from ecology to spacecraft environmental systems.

## 21,500 YEAR OLD SKELETON FOUND IN CALIFORNIA DESERT

What may be the earliest complete skeletal remains of a human ever found in the Western Hemisphere have been unearthed in the Yuha Desert not far from the Mexican border.

Preliminary Carbon 14 dating by Geochron Laboratories, Cambridge, Mass., indicates the bones are about 21,500 years old.

The "Yuha Man" was discovered recently by Morlin Childers, 54, an amateur archeologist who has spent his life looking for evidence of early man in the Southern California desert.

### Attracted by Rock Pile

Bone fragments and materials found embedded within the skeleton now are being studied in Japan, at the University of Arizona and at USC for more positive dating.

The excavation site was a small ravine a half-mile from heavily traveled Highway 98.

Childers was attracted to the site by a pile of rocks strewn over the ground in such a manner "that I knew they had to have been placed there by man, not nature."

He found the bones 14 inches below the surface. He believes the rocks were placed on top of the grave to protect the remains from animals.

Previous early man discoveries in the New World have been a skeleton 17,500 years old found in Peru and a human bone found in the La Brea tar pits tentatively dated at 23,000 years.

Dating on the La Brea find, however, was hampered by insufficient material.

The skeleton found by Childers is embedded in concrete-like solidified sand. It has been taken to the University of Arizona's anthropology laboratory in Tucson.



The "Yuha Man" bones, much like those shown here, have been tentatively dated at 21,500 years, making it the oldest complete skeletal remains ever found in North America.

## ASTRONAUTS TO CLEAN UP WITH SHOWER

Astronauts on the Skylab mission will be able to wash that space dust right out of their hair with a shower system designed for zero-gravity environment.

When the Skylab workshop is placed in orbit next year, astronauts Charles Conrad Jr., Dr. Joseph P. Kerwin and Paul J. Weita will be able to take earth-type shower baths, thanks to the ingenuity of researchers at the National Aeronautics and Space Administration's Langley Research Center.

The shower cubicle, according to John B. Hall Jr. of LRC, is a collapsible fabric arrangement which will be anchored to the spaceship's deck and opened only when needed.

### Water Won't Drain

Water, in zero-gravity environment, presented special problems. Instead of flowing downward, the water sticks to the person and the shower walls and cannot be transferred to the drain.

To overcome the flow problem, the researchers devised a vacuum-towel technique in which a small vacuum cleaner device sucks the water droplets from the wall, transporting them to the storage site. In addition, the bather uses special towels.

"There were all sorts of problems to solve," Hall said.

"We discovered that a hand-held spray would best meet our needs, rather than the traditional shower fixture in the ceiling or side of the wall.

"Our job was to find a way for the astronauts to take a total bath, including the head, in zero gravity, and retrieve the water for subsequent reuse."

Space shower bath technology development at the research center began in 1968 when scientists realized there would be a personal hygiene facility requirement as longer space trips were made. The idea was to come up with something to sustain the astronauts—bath-wise—for periods up to two years or more.

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## SCROLLS, from page 8

merchant in antiques who hid them from Egyptian authorities by storing them in a chicken coop in Cairo. Some still have chicken feathers stuck to them.

Issa Marugi, an Assyrian Christian in Jerusalem, heard of the collection from friends in Egypt and bought it. The scrolls were placed aboard a plane by a "respected Egyptian gentleman."

They reached Jordan in October, 1969. Marugi's agent collected them, transported them across the Jordan River into Israeli-held territory and handed them to their new owner. News of the scrolls first became public then.

Egypt accused Marugi, a hospital director, of stealing its national treasures. Jordan charged the collection had been perfidiously delivered to the enemy, Israel.

But Marugi produced a deed of sale and an official Jordanian import license. "Let Egypt scream," he snorts. "They leave their treasures in a chicken coop? I'll send them the feathers."

The Israelis, suffering from economic woes, weren't willing to buy. An official committee found the papyri authentic

and worth the price asked. But the cabinet averred that any million dollars should be spent on Jewish artifacts rather than Moslem.

In June, 1970, despite Israeli protests, Marugi had the scrolls hand-carried to Liechtenstein.

"An institute wanting to make its name in Islamic research would have decades of vital work if it bought the collection and studied it," said Prof. Jacob Lassner, a Near Eastern studies scholar at Wayne State University, Detroit.

The scrolls, wrapped around sticks and opened by a month-long steaming process, are remarkably preserved, Sharon of the Hebrew University said. He made a preliminary study and catalogued them before they left Israel. Many can be read with the naked eye and need no chemical treatment.

## Business and Law

Most of the papyri deal with business and law. There are receipts, creditor claims, merchants' shopping lists for items like wheat and sugar. A letter from an influential Egyptian to the Cairo police chief requests the release of a recalcitrant relative.

citant relative.

The collection also contains poetry, personal letters and tracts from the Koran, which a devout Moslem might want to hide because they do not tally exactly with the accepted version of that holy book.

"With this material we can study the finances of the time, learn what prices were, how debtors were dealt with," said Sharon. "We see how the Jewish and Christian minorities were taxed—which in effect shows how they were treated."

"A fragment like the letter to the police chief illuminates vividly the kind of life style of the time."

The Islamic empire declined, he said, because of faulty economics and neglect of agriculture in favor of trade—"and the roots of the sickness can be seen in the papyri, if you regard them as a kind of newspaper of the time."

Lassner of Detroit said there is a dearth of original material on the first two centuries after Mohammed. Sharon observed: "It is a great pity. Now the papyri lie in a bank. Who knows for how long? Someone should be at work deciphering them."



Dr. Ronald Doctor recently reported to the California Assembly on the subject of nuclear reactors.

## CUTBACK ON REACTOR CONSTRUCTION URGED BY RAND ENGINEER

An engineer with Rand Corp. said that California should build more nuclear reactors "only when all other alternatives (in the quest for electricity) have failed."

Dr. Ronald Doctor, one of the principal authors of a Rand study on California's energy "quandary," told a state Assembly subcommittee that the state should "go slow" in the development of nuclear power plants because of unanswered questions over safety.

Doctor made the presentation during a hearing on the study of the Assembly's subcommittee on state electrical energy policy.

Assemblyman Charles Warren, chairman of the subcommittee, said those who wish to comment on the findings of the Rand researchers will be heard at a later date.

Assemblyman Paul Priolo, chairman of the Assembly's Committee on Planning and Land Use, attacked the Atomic Energy Commission during the hearing for "advocating" nuclear power when serious questions over safety remain unanswered.

Doctor pointed out that there is no known method for handling radioactive waste products of nuclear reactors, thus posing a threat to future generations.

The AEC is aware of that problem, Priolo said, yet it goes "merrily on its way" advocating the construction of more nuclear plants.

The Rand study concluded that California must slow its growth rate in the use of electricity if it is to meet the demands of the future. The study, financed by the state, the Rockefeller Foundation and the National Science Foundation, was released during a press conference at the Santa Monica corporation's headquarters.



## AMERICAN AIRLINES WINS SPACE SHUTTLE JOB

North American Rockwell Corp. has turned to American Airlines to buy engineering know how for the ground maintenance and turnaround program of the space shuttle vehicle being developed by North American's space division in Downey.

The airline's maintenance and engineering center at Tulsa, Okla., was awarded a subcontract to provide engineering services during the six years that North American will be designing, developing and testing the reusable space vehicle, North American said. The "space truck" vehicle will make repeated trips into orbit and back.

North American spokesmen said the contract is worth "in the tens of millions of dollars," but said they could not pin down its value because the work to be done is still being defined.

# Ten little losers, standing in a line. One bought our magazine. Then there were nine.



Since hamburger prices went through the roof, Alice feeds her kids hot dogs instead. She doesn't know that ground beef may be a better buy for nourishment, or that a plain old peanut-butter sandwich could be better yet.

Bill didn't trust his thermostat, so he bought a \$5 household thermometer to check it. Now he's completely confused—and he could have solved his problem for 69¢.



A range with a self-cleaning oven was Chris's dream come true. Six months, two burns, and a tough scrubbing later—she wished she'd checked *Consumer Reports* before she picked out her dream machine.



Debbie's motto was, "you get what you pay for," so she paid \$400 for a zigzag sewing machine. She didn't know that her nylon turtleneck blouse would have turned out better on the \$250 machine she bypassed.



Frank's pride and joy was the new single lens reflex camera he'd bought for \$340. Too bad he didn't hear about the one *Consumer Reports* rated a "Best Buy" for \$164 less.

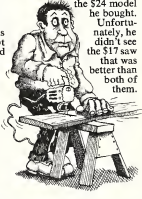


When Ed decided to refinish his boat, he spent \$3.20 a quart for paint remover. If he'd known better, he could have saved 55¢ a quart—and stripped it cleaner in half the time.

Grace made sure that the family toothpaste was a whitening, brightening, cavity fighting brand. She had to learn the hard way that what's good for the kids may not be good for grown-ups.



Handyman Henry is nobody's fool; he knew that the \$45 sabel saw the salesman was pushing was no better than the \$24 model he bought. Unfortunately, he didn't see the \$17 saw that was better than both of them.



Ida listened to a half dozen compact stereo systems before she chose her \$250 set. How could she guess that a model that cost just \$1 more would give her a lot more value for her money.



Johnny decided he'd wasted his last dollar on noisy outboard motors that jammed in weeds, one-coat paints that didn't cover, air-conditioners that dripped puddles onto his patio, door locks that all but invited burglars to break in, luggage that ended up without handles, washing machines that walked across the floor, and products that just weren't worth the price. He subscribed to *CONSUMER REPORTS*.

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## REVIEWS

by Dorothy Simon

**Norman Spinrad's latest book, THE IRON DREAM, gives us a look into the twisted mind of one of history's most blood-soaked dictators, written with the style of the beast, from the view of the beast, and steeped in the blood-lust of the beast.**

Most science fiction is based on the premise "What If?" What if we could travel to the stars? What if there are other worlds out there, peopled by intelligent beings? What if we could journey through time? What if? What if? What if? . . .

What if Hitler had emigrated to the United States instead of to Germany from his home in Austria? What if he had become a writer, instead of a political power? What if he had written science fiction?

He might have written *The Iron Dream*. In the book, he did write *The Iron Dream*, after becoming a hack science fiction artist in his new home-

land. In reality, though, Norman Spinrad wrote *The Iron Dream*—a book which gives us an insight into what the real Hitler's dream was, carried beyond all imagining. In Spinrad's book Hitler portrays a society where genetic background is the determining factor for individual success, where accident of birth can make or break you. The wrong genes can mean anything from sterilization to exile or euthanasia. A society rigidly bound by codes and tests designed to weed out the undesirable, and ruled by a paragon of excellency, Feric Jagger. Jagger is a standard of purity for the world of Helder, a thinly veiled America of the future which has been decimated by atomic warfare and where genetic warping is the norm. Feric Jagger is Hitler's ideal human genotype come to life. Blond, tall, strong, fanatically dedicated, his sole aim is to clear his world of the mutants, the misfits, the unwanted. He wants, at any cost, to make it a perfect world, a haven for men exactly like him, "true" men. Here is how Spinrad's Hitler wrote of his vision:

"No man cared to contemplate even in fancy the return of the Fire. Out of these few brief days of holocaust centuries past stemmed the major ills still plaguing the world: genetic contamination of the human race, the vast radioactive wastelands that covered so much of the globe, the existence of the fetid Doms. The old world had died in the Time of Fire; the new world which had been born was a stunted and pallid imitation of the glory of the ancients. True men would curse the Time of Fire as long as the race survived.

"But someday, and within his own lifetime, true men would be irrevocably on the clear path to a new Golden Age..."

That is Jagger's dream. It seems pure and idealistic. But later his dream becomes an obsession.

The only opposition to Jagger's irresistible force comes from the Doms, or Dominators, genetically warped beings that appear human but which have the power to totally control men's minds. Their country of Zind is a thinly disguised Russia. They wish a world ruled by a select few, themselves, of course, and peopled with slaves under their complete control. They breed humans for specific tasks: their Warriors are pin-headed hulks made for combat and unable to function on even the most basic level without the direction of their Dom. In the battles between Jagger's

EXERPT FROM *THE IRON DREAM*, by Norman Spinrad, published September, 1972, Avon Books, New York City, New York.

The first rays of dawn illumined a ghastly landscape. Here nothing grew but scraggly and putrescent patches of radiation jungle. Huge ponds had been dug in the unyielding, contaminated earth; these were choked with slimy grey-green scum which no doubt was processed for slave fodder. The reek of these algae pools was overpowering, indistinguishable from that of open cesspools. Among these ponds were scattered rude wooden corrals which confined a revolting assortment of genetically twisted livestock: bloated legless swine wriggling about in the muck like giant pallid worms, six-legged cattle with tiny vestigial heads and cloacae from which dribbled green-brown ooze, hairless purple goats that trailed gross blue udders in the mud, chickens with a syrupy coating of viscous green mucous in lieu of feathers.

"The slaves tending this perverted travesty of farmland more than fit their surroundings; a more revolting collection of mutants it had never been Feric's misfortune to see. Here such as Parrot-faces, Toadmen, and dwarfs stood out as paragons of genetic virtue! Skinless creatures covered with red ooze through which bluish blood vessels could be seen pulsing were a common sight as were green bipeds with empty insect-eyes and arms ending in clusters of tentacles.

"Despite the importance of time, Feric slowed the Helder advance in order to assure that every last one of these abominations was blasted to bits, burned, or mashed beneath the treads of the tanks and every putrid scum-pond blown sky-high with purifying explosives..."

"Feric found himself isolated with Best in a timeless universe of fiery battle, a world filled with foul Warriors surging forward, firing their machine guns, tearing their bare fingers to pieces against the steel armor plate, bursting into flame, ground to a thick red gruel beneath the treads of the tanks. His nostrils were filled with the aroma of roasted flesh mingled with the heady stench of gunpowder. . . . His flesh was a direct extension of the machine gun he fired; the bullets seemed to emerge in a fiery stream from the depth of his own being, he could all but feel them ripping into the flesh of the Warriors who went down before his spurting weapon. Through the tremors of the onrushing tank, he could feel the bodies being crushed beneath the treads." O



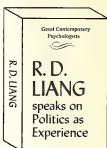
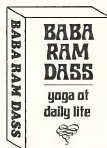
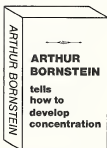
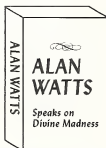
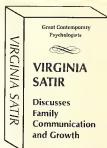
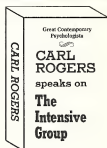
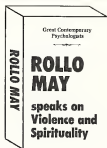
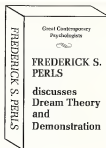
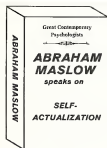
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# BIG BLACK BIRD

The SR-71 is the most advanced aircraft in the world, capable of sustained Mach 3 flight at over 100,000 feet.



## THE BLACKBIRD

America's bullet-fast Blackbirds roost at a heavily guarded nest north of Sacramento, awaiting assignment to secret, fringe-of-space reconnaissance flights anywhere in the world.

Their mission: To provide U.S. military and civilian decision makers with timely information for what the State Department calls "crisis management."

Incredible successors to the U-2 spy plane, their role obviously lies between that of the USAF's hush-hush reconnaissance satellites and the nation's far-flung network of undercover agents and hidden monitoring stations.

If special information is needed quickly for a crucial decision—perhaps days before a surveillance satellite would be on track to check a given area—the Ninth Strategic Reconnaissance Wing gets the call.

A unit of the Strategic Air Command, the unusual wing commanded by Col. Jerome F. O'Malley has one squadron with an undisclosed number of the big, delta-wing Blackbirds—SR-71s—the closest plane yet to an intercontinental missile.

But instead of a warhead or bombs or rockets, or any armament whatsoever, the Blackbirds carry a vast array of super-sophisticated reconnaissance systems, exotic electronic sensors and cameras and recording gear to keep a sharp Yankee eye wherever it's needed, night and day.

They also carry elaborate electronic countermeasure (ECM) equipment to jam radar search signals and thwart hostile missiles that might be launched against them from the ground or from fighter interceptors.

Otherwise, pilots say, the superb air-

craft designed and produced by Lockheed's famed Clarence L. (Kelly) Johnson and his secret "Skunk Works" in Burbank is virtually all fuel tanks and engines.

The Blackbird, they note with understandable pride, could pace a rifle slug with its sustained speed of Mach 3 plus—better than 2,000 m.p.h. The SR-71 flies so fast, they add, that it requires 180 miles to complete a 180-degree turn and reverse direction.

Strategic operations of the mysterious all-black aircraft have been secret—even from most of the Air Force—since the SR-71 Wing was commissioned in 1965.

Security-conscious wing personnel are cautious in talking of their mission, limiting discussion to training, general flight characteristics of the SR-71 and domestic operations, but it can be speculated that:

—The tripersonic Blackbirds based at Beale apparently could fly all required missions out of this California base, if necessary, but probably don't do so because of the special pre-positioning that would be required for a refueling tanker fleet.

—Overseas operations probably are conducted out of various foreign (U.S. or Allied) bases on secret temporary assignment, as required.

An idea of the big plane's capability can be seen in a recent record set by a Blackbird that won the Mackay Trophy for Lt. Col. Thomas B. Estes and DeWain C. Vick.

They flew 15,000 miles nonstop over the United States in 10½ hours—equivalent to the distance from San Francisco to Paris and return—averaging about 1,430 m.p.h., faster than twice the speed of sound.

And this included descending from above 80,000 feet to 25,000 feet and

slowing from tripersonic speed to 400 m.p.h. for an unspecified number of 15 to 18-minute refuelings from a KC-135 jet tanker.

The record points up the great advantage of the SR-71 over all planes flying today, despite the fact that Kelly Johnson laid out the basic design of the aircraft in 1959, more than a dozen years ago.

That advantage is sustained speed, the ability to cruise at more than three times the speed of sound for thousands of miles while late-model fighters reach much above Mach 2 (1,320 m.p.h.) only at dash or temporary all-out speed.

### Sustained Speed Cited

Sustained tripersonic speed is the great advance achieved in the Blackbird over the U-2 spy plane in which Francis Gary Powers was shot down over Russia on May 1, 1960.

While the single-engine U-2, also developed in secrecy by Johnson and the Skunk Works, was ahead of its time, it was essentially a jet-powered glider, a 46-foot fuselage soaring on an 80-foot wing.

True, it could climb to 90,000 feet and remain aloft 9½ hours without refueling, but the fact that it was slow, a 17,000-pound kite that depended on altitude for protection, eventually made it vulnerable to Soviet missile development.

The fate of the U-2 evoked a question at Beale about improved Russian surface-to-air (SAM) missiles such as the SA-5 Griffon, credited by the trade magazine, *Aviation Week*, with a 95,000-foot intercept capability. Would such a weapon menace the Blackbird?

And how would the SR-71 fare in skies defended by such aircraft as the tripersonic Soviet Mig 23 Foxbat interceptor armed with air-to-air missiles?



## Guarded Answers

The answers were guarded and it was quickly obvious that no one at Beale, from Col. O'Malley down, would undertake specific comparisons with Soviet capability.

They discussed surface-to-air missiles, in general, however, their speed, their reach and the phenomenal tracking problem that would be imposed on them by the SR-71's extreme speed and altitude and its sophisticated electronic counter measures, particularly signal jamming techniques.

Col. O'Malley, a veteran of many fighter missions in Vietnam, pointed out that F-4 Phantoms survived in an extremely hostile, medium altitude (Soviet SA-2) missile environment because of tactics and defensive equipment.

## Fly Faster, Higher

"We fly a lot faster and higher and longer," he said of Blackbird operations, "and we carry much better defense equipment."

As for the Foxbat, he posed a theoretical situation:

"If we were going to fly over a certain spot in the Atlantic Ocean . . . and some enemy knew exactly when and where and positioned a Foxbat at a precise and ideal point just before we got there . . . obviously this would be a threat . . ."

"Personally, I think we can do our mission without worrying too much about an airplane like the Foxbat."

## Utmost Confidence

There could be no doubt that O'Malley and his crew have the utmost confidence that the Blackbird's scorching, sustained speed at amazing heights—combined always with the element of surprise—offers all the protection needed for effective reconnaissance anywhere.

How fast and how high can the SR-71 fly? The Air Force will say only "above Mach 3 and higher than 80,000 feet." Aviation Week, however, gives the bird a ceiling of 100,000 feet. Other unofficial estimates say its speed could be as high as 2,300 m.p.h.

It must be emphasized that these are estimates and can in no way be attributed to the Air Force.

Its gross (fully loaded) weight also is classified, but it can be said that the special fuel it carries more than doubles its basic weight. This "all-up" weight is known to be more than 69,000 pounds, the total thrust of its two huge Pratt & Whitney J-58 jet engines.

In appearance, the Blackbird is as awesome as its performance.

From the side its slim, 107-foot length

gives it the look of an enormous black pencil.

In top view it is a massive black dark with a delta (triangle) wing spanning 55 feet that sweeps into narrow wing sections called chines along both sides of the fuselage, tapering into the pointed nose.

Head on, the chines give the Blackbird the flared, flat-bellied appearance of a speedboat, with engines far aft, tipped by twin rudders canted inboard.

## Crew in Tandem

Its crew is seated in tandem near the nose, the pilot forward, just ahead of a reconnaissance systems officer (RSO) who serves many of the functions of a co-pilot although he has no flight controls.

He is the navigator, radio communicator, fuel monitor and he handles all the checklists in addition to presiding over all of the secret reconnaissance systems that peer earthward from locations in the forward chine areas.

Practically all the rest of the Blackbird's fuselage and wings are filled with the special jet fuel needed because normal fuel would auto-ignite and explode under the 500 to 600-degree temperatures developed on the SR-71's titanium skin by air friction at Mach 3 speeds.

## Residual Heat

If the plane lands straight in, without any turns in a holding pattern, high residual heat from its exposure to triple-sonic air friction can make it difficult for ground crews to handle until it cools off.

Although flight crews at Beale are tight-lipped about reconnaissance mission, they're understandably proud of the Blackbird and eager to talk about the airplane insofar as they can.

They'll tell you:

—That every flight in the superplane is exciting no matter how many times they fly.

## Must 'Stay Ahead'

—That every mission demands not 100% alertness on the part of the pilot and the RSO, but a constant 200% if they are to "stay ahead" of their aircraft as it streaks through the thin air at the top of the atmosphere.

—That abnormal conditions—trouble—can develop swiftly if crew attention wanders even momentarily during an otherwise uneventful flight, even though the Blackbird is on autopilot (to provide a precise platform for the reconnaissance sensors) and navigating itself by computer tape.

—That projectors in both cockpits au-

tomatically display map presentations of the aircraft's position at all times, regardless of the speed flown, together with pertinent data such as fuel, times, headings and radio frequencies.

—That the Blackbird is the only plane known that increases its efficiency—actually lowering its fuel consumption—the faster it flies.

—That the initiation of descents from high altitude must be timed with absolute precision, considering the tremendous energy of the streaking plane. A miscalculation of seconds translates into an error of many miles in landing approach or refueling rendezvous.

—Despite its amazing performance at altitude and the problems imposed by bullet speed, the SR-71 is a thoroughly honest and docile airplane in normal traffic pattern flight despite the fact that it has no such systems as flaps and speed brakes.

## Wear Space Suits

Blackbird crewmen wear Gemini space suits and ride in eerie silence except for radio communications and the rasp of pressure breathing.

All other sounds, even the thunder of jet engines and after-burners, are shut out by their space helmets. These are worn closed at all times to protect against instant death if a cockpit canopy should rupture with explosive decompression at great heights.

Even a sense of touch is denied the crewmen by the special boots and gloves they must wear, although they could pick up a dime with the gloves if need be.

Strangely, the SR-71 does not incorporate a capsule system, either single or double, for crew protection in an emergency bailout at high speed and altitude.

## Saving Weight

"It's a matter of saving weight," one pilot explained. "But live tests have proved we can eject safely at Mach 3 in our space suits and free-fall to 15,000 feet for automatic parachute deployment."

Because SR-71 missions are so mentally and physically demanding, Blackbird crewmen are top pilots chosen as carefully as astronauts. In fact, they must pass the same physiological and psychological tests. And like astronauts also, they must pass a physical examination before every flight.

Unlike America's much-publicized spacemen, however, they are little known, for although their missions are high and hot, hazardous and frequent and of extreme importance to national security, they fly in secrecy . . .



G. Barr 1972



## PATRON of the ARTS

fiction/

William Rotsler

**True Art requires involvement—total involvement—on the part of the artist. Sometimes, though, the subject of the art can also become involved, and when you are dealing with a new art form, that can mean. . . .**

**"The cubes can be so eerily lifelike that the rumors of them taking a piece of your soul persist."**

She stares out at you from her cube of near blackness, calm, quiet, breathing easily, just looking at you. She is naked to the hips where a jeweled girdle encircles her, and she sits regally on a pile of luxurious pillows. Her long white hair cascades down over her apricot-colored shoulders and is made to shimmer slightly by some hidden light.

As you come closer to the life-size sensatron the vibrations get to you. The startling reality of the three-dimensional image cannot be overstated, for Michael Cilento's portrait of one of history's greatest society courtesans is a great work of art.

As you view the cube the image of Diana Snowdragon stops being quite so calm and in some subtle way becomes predatory, commanding, compelling. She is *naked*, not nude. The drifting bell-sounds of melora musicians are heard . . . almost. The power of her unique personality is overwhelming, as it is in person, but in this artist's interpretation there are many other facets exposed.

Diana's sensatron cube portrait is universally hailed as a masterpiece. The subject was delighted.

and blankers.

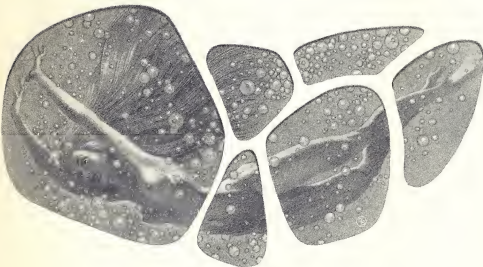
Sensatrons are the ultimate marriage of art and science. At least so far. The sciences are constantly supplying tools to the artists, whether it be fade-safe paint that will be bright a thousand years from now, or an electron brush to make meticulous changes in a scan pattern. Already the *quiver* groups are exploring the new brainwave instruments that create music *only* in the brain itself.

But the sensatrons are the rage of the moment. Just as the shimmercloth fashions of the *quiver* generation were seized by the media and exploited, the advertising world is impatient for immense sensatrons to be made possible, building-size product replicas with "Buy me!" shouting in your forebrain. In anticipation I have started one of my research labs on a blanker device to shut out the anticipated electronic noise.

The cubes can be so eerily lifelike that the rumors of them taking a piece of your soul persist. Perhaps they are right. Not only do the cameras capture the exterior, providing the basis from which the sensatron artist works, but the alpha and beta recorders, the EEG machines, the subtle heartbeat repeaters, all record what is going on within. Many artists use a blending of many recordings taken over a period of sittings. Some use single specific moments or moods, each recorded and then projected by the differentiated sonic cones and alpha-beta projectors. Along with these projections the artist adds his own interpretation, creating an almost musical concerto of waves, working upon any human brain within the area of reception. It is still the prerogative of the artist to select, eliminate, diminish, or whatever he desires. Some sensatron portrait artists put in the emotional warts as well as the strengths, and others are flatterers. Some artists are experimenting with switched recordings, woman for man, animal for subject, pure abstracts substituting for reality. Every one that attempts it brings to it a new point of view.

All Mike Cilento wanted to do is project the truth as he saw it. Perhaps he did peel off a layer of soul. I have stood next to the living model of a sensatron portrait and found the cube much more interesting than the person, but only when the artist was greater than the subject.

Mike's portrait of society's most infamous—and richest—wanton made him famous overnight. Even the repro cubes you can buy today are impressive, but the original, with its original subtle circuits and focused broadcasts, is stagger-



The artist was disgusted and told me that the ego of the subject prevented her from seeing the reality he had constructed.

But it was this cube that gave Michael Benton Cilento the fame he wanted, needed, and hated. This was his first major sensatron cube and cubes were just then beginning to be used by artists, instead of scientists. It was becoming "fashionable" to be working in sensatrons then and everywhere there was shop talk of electron brushes, cilli nets

**"The cube was filled with a dozen  
golden sculptures and the vibrations  
of love and peace."**

ing.

A collector in Rome brought Cilento to my attention, and when I had seen the Snowdragon cube I managed an introduction. We met at Santini's villa in Ostia and like most young artists he had heard of me.

We met by a pool and his first words were, "You sponsored Wiesenthal for years, didn't you?" I nodded, wary now, for with every artist you help there are ten who demand it.

"His *Montezuma* opera was trash."

I smiled. "It was well received."

"He did not understand that Aztec anymore than he understood Cortez." He looked at me with a challenge.

"I agree, but by the time I heard it, it was too late."

He relaxed and kicked his foot in the water and squinted at two nearly nude daughters of a lunar mineral baron that were walking by. He seemed to have made his point and had nothing more to say.

Cilento intrigued me. In the course of a number of years of "discovering" artists I had met all types, from the shy ones who hide to the burly ones who demand my patronage. And I had met the kind who seem indifferent to me, as Cilento seemed to be. But many others had acted that way and I had learned to disregard everything but finished work and the potential for work. "Your Snowdragon cube was superb," I said.

He nodded and squinted in another direction. "Yeah," he said. Then as an afterthought he added, "Thank you." We spoke for a moment of the cube and he told me what he thought of its subject.

"But it made you famous," I said.

He squinted at me and after a moment he said, "Is that what art is about?"

I laughed. "Fame is very useful. It opens doors. It makes things possible. It makes it easier to be even more famous."

"It gets you laid," Cilento said with a smile.

"It can get you killed, too," I added.

"It's a tool, Mr. Thorne, just like molecular circuits or dynamic integration or a screwdriver. But it can give you freedom. I want that freedom; every artist needs it."

"That's why you picked Diana?"

He grinned and nodded. "Besides, that female was a great challenge."

"I imagine so," I said and laughed, thinking of Diana at seventeen, beautiful and predatory, clawing her way up the monolithic walls of society.

We had a drink together, then shared a psychedelic in the ruins of a temple of Vesta, and became Mike and Brian to each other. We sat on old stones and leaned against the stub of a crumbling column and looked down at the lights of Santini's villa.

"An artist needs freedom," Mike said, "more than he needs paint or electricity or cube diagrams or stone. Or food. You can always get the materials, but the freedom to use them is precious. There is only so much time."

"What about money? That's freedom, too," I said.

"Sometimes. You can have money and no freedom, though. But usually fame brings money." I nodded, thinking that in my case it was the other way around.

We looked out at the light of a half-moon on the Tyrrhenian Sea and had our thoughts. I thought of Madelon.

"There's someone I'd like you to do," I said. "A woman. A very special woman."

"Not right now," he said. "Perhaps later. I have several commissions that I want to do."

"Keep me in mind when you have time. She's a very unusual woman."

He glanced at me and tossed a pebble down the hill. "I'm sure she is," he said.

"You like to do women, don't you?" I asked.

He smiled in the moonlight and said, "You figured that out from one cube?"

"No. I bought the three small ones you did before."

He looked at me sharply. "How did you know they even existed? I hadn't told anyone."

"Something as good as the Snowdragon cube couldn't come out of nowhere. There had to be something earlier. I hunted down the owners and bought them."

"The old lady is my grandmother," he said. "I'm a little sorry I sold it, but I needed money." I made a mental note to have it sent back to him.

"Yes, I like doing women," he said softly, leaning back against the pale column. "Artists have always liked doing women. To . . . to capture that elusive shadow of a flicker of a glimpse of a moment . . . in paint, in stone, in clay, or in wood, or on film . . . or with molecular constructs."

Rubens saw them plump and gay," I said. "Lautree saw them depraved and real."

"To Da Vinci they were mysterious," he said. "Matisse saw them idle and voluptuous. Michelangelo hardly saw

them at all. Picasso saw them in endless mad variety."

"Gauguin . . . sensuality," I commented. "Henry Moore saw them as abstracts, a starting point for form. Van Gogh's women reflected his own mad genius brain."

"Cezanne saw them as placid cows," Mike laughed. "Fellini saw them as multifaceted creatures that were part angel, part beast. In the photographs of Andre de Dienes the women are realistic fantasies, erotic and strange."

"Tennessee Williams saw them as insane cannibals, fascinatingly repulsive. Sternberg's women were unreal, harsh, dramatic," I said. "Clayton's females were predatory fiends."

"Jason sees them as angels, slightly confused," Mike said, delighted with the little game. "Coogan saw them as motherly monsters."

"And you?" I asked.

He stopped and the smile faded. After a long moment he answered. "As illusions, I suppose."

He rolled a fragment of stone from the time of Caesar in his fingers and spoke softly, almost to himself.

"They . . . aren't quite real, somehow. The critics say I created a masterpiece of erotic realism, a milestone in figurative art. But . . . they're . . . wisps. They're incredibly real for only an instant . . . fantastically shadowy another. Women are never the same from moment to moment. Perhaps that's why they fascinate me."

I didn't see Mike for some time after that, though we kept in touch. He did a portrait of Princess Helga of the Netherlands, quite modestly clad, the cube filled with its famous dozen golden sculptures and the vibrations of love and peace.

For the monks at Welles, on Mars, Mike did a large cube of Buddha, and it quickly became a tourist attraction. Repro cubes made a small fortune for the monastery.

Anything Mike chose to do was quickly bought and commissions flowed in from individuals, companies and foundations, even from movements. What he did was a simple nude of his mistress of the moment. It was erotic enough in pose, but powerfully pornographic in vibrations, and after Mike left her she received a Universal-Metro contract. The young Shah of Iran bought the cube to install in his long-abiding Gardens of Babylon.

For his use of alpha, beta and gamma wave projectors, as well as advances in differentiated sonics, Mike was the sub-



**"He was proving himself as an  
innovator and engineer as well as an artist,  
an unusual combination."**

ject of an entire issue of *Modern Electonics*.

Mike had paid his dues towards his art, for while studying at Cal Tech he had worked on the Skyshield project, a systems approach to electronic defense against low energy particles to use on the space stations. After graduation he had gone to work at the Bell lab in their brainwave complex on Long Island. He quit when he got a Guggenheim grant for his art.

From his "Pleasurewoman" cube General Electric picked up some of Mike's modifications for their new multi-layer image projectors and beta wave generators. For the artists that use models or three-dimensional objects to record the basic image cycle—such as breathing, running water, or repeating events—Nakamura, Ltd. brought out a new camera design in circular pattern distribution that contained many of Mike's suggestions. For the artist working in original abstractions, Mike built his own ultra-fine electron brush and an image generator linked with a graphics computer that produced an almost infinite number of variables. Mike Cilento was proving himself as an innovator and engineer as well as artist, an unusual combination.

I met Mike again at the opening of his "Solar System" series in the Grand Museum in Athens. The ten cubes hung from the ceiling, each with its non-literal interpretation of the sun and planets, from the powerball of Sol to the hard, shiny ballbearing of Pluto.

Mike seemed caged, a tiger in a trap, but very happy to see me. He was a volunteer kidnaper as I spirited him away to my apartment in the old part of town.

He sighed as we entered, tossed his jacket into a Lifestyle chair and strolled out onto the balcony. I picked up two glasses and a bottle of Cretan wine and joined him.

He sighed again, sank into the chair, and sipped the wine. I chuckled and said, "Fame getting too much for you?"

He grunted at me. "Why do they always want the artist at openings? The art speaks for itself."

"Public relations. To touch the hem of creativity. Maybe some of it will rub off on them." He grunted again, and we lapsed into comfortable silence, looking out at the Parthenon, high up and night-lit.

At last he spoke. "Being an artist is all I ever wanted to be, like kids growing up to be astronauts or ball players. It's

an honor to be able to do it, whatever it is. I've painted and I've sculpted. I've done light mosaics and glow dot patterns. I even tried music for awhile. None of them really seemed to be it. But I think molecular constructs are the closest."

"Because of the extreme realism?"

"That's part of it. Abstraction, realism, expressionism—they're just labels. What matters is what *is*, the thoughts and emotions that you transmit. The sensation units are fairly good tools. You can work almost directly on the emotions. When GE gets the new ones ready, I think it will be possible to get even more subtle shadings with the alpha waves. And, of course, with more units you can get more complex."

"You are as much an engineer as you are an artist," I said.

He smiled and sipped his wine. "Every medium, every technique has those who find that area their particular feast. Look at actors. Once there was only the play, from start to finish, no retakes and live. Then came film and tape and events shot out of sequence. No emotional line to follow from start to finish. It takes a particular kind of actor who can discipline himself to those flashbacks and flashforwards. In the days of mime there were probably superb actors lost because their art was in their voice."

"And today?" I prompted.

"Today the artist who cannot master electronics has a difficult time in many of the arts. Leonardo da Vinci could have, but probably not Michelangelo. There are many fine artists born out of their time, in both directions."

I asked a question I had often asked artists working in non-traditional media.

"Why is the sensortron such a good medium for you?"

"It is immensely versatile. A penline can only do a certain number of things and hint at others. An oil painting is static. It attempts to be real but is a frozen moment. But sometimes frozen moments are better than motion. A motion picture, a tape, a play all convey a variety of meanings and emotions, even changes of location and perspective. As such they are very good tools. The more you can communicate the better. With the power of the sensortron you can transmit to the viewer such emotions, such feelings, that he becomes a participant, not just a viewer. Involvement. Commitment. I wouldn't do a sensortron to communicate some things, just because it's so much work and the communication minor. But the sensortron units can do almost anything any other

art form can do. That's why I like it. Not because it's the fashionable art form right now."

"You've had no trouble getting your first license?" I asked.

"No, the Guggenheim people fixed it." He shook his head. "The idea of having to have a license to do a piece of art seems bizarre." He lifted his hand before I spoke. "Yeah, I know. If they didn't watch who had control of alpha to omega projectors we'd be trooping to the polls to vote for a dictator and not even know we didn't want to. Or so they think."

"It's a powerful force, difficult to fight. Your own brain is telling you to buy, buy, buy, use, use, use, and that's pretty hard to fight. Think of it like prescription drugs."

He nodded his head. "Can't you just see it? I'm sorry, Michelangelo, but this piece of Carrara marble needs a priority IX license and you have only a IV." And Michelangelo says, 'But I want to do this statue of David, see? Big, tall boy, with a sling, kinda sullen looking. It isn't because he'll be nude, is it?' You just go to the Art Control Board in beautiful downtown Florence, *Signor* Buonarroti, and fill out the papers in triplicate, last name first, first name last. And remember neatness counts. Speak to Pope Julius, maybe he can fix it for you."

We laughed gently in the night. "But art and technology are coexisting more now than ever," I said.

"Oh, I understand," Mike sighed, "but I don't have to like it." I thought about the Pornotron someone had given me, hanging from the ceiling of my Moscow apartment. One night with a healthy blonde clarinetist had been enough to convince me I didn't need artificial enhancement of my sexual pleasures. It was like being forced your favorite dessert.

We lapsed into silence. The ancient city murmured at us. I thought about Madelon.

"I still want you to do that portrait of someone very close to me," I reminded him.

"Soon. I want to do a cube on a girl I know first. But I must find a new place to work. They bother me there, now that they found where I am."

I mentioned my villa on Sikinos, in the Aegean, and Mike seemed interested, so I offered it to him. "There's an ancient grain storage there you could use as a studio. They have a controlled plasma fusion plant so there would be as much power as you need. There's a house, just the couple that takes care of it, and a

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# 2001 HYPOTHESIS

article/Gregory Benford

Has Earth received visitors from the stars? Did they leave us anything—any message, any legacy—and if they did, where might we look for it?

Everyone knows that the background circumstances sketched by Kubrick and Clarke in *2001: A Space Odyssey* were fantasy. Everyone accepts that the earth has not been visited by intelligent extraterrestrials, and there are no “monoliths” left behind as a calling card.

I would like to propose that in this case, what “everyone knows” may be wrong.

True, we have found no monoliths or other records of alien visits—at least, none we can seriously credit. But this fact may be the outcome of our lack of imagination, our inability to look in the right places. I think it is worth the

time to seriously, dispassionately look into the possibility that intelligent beings may have visited the earth, or ventured into the solar system sometime in the distant past.

Thinking about this question in a systematic way is not easy. We are trained to believe that good, hard, no-nonsense thinking is the best way to attack problems. But here something different is needed—soft thinking, if you will. By this I mean the ability to speculate but remain within boundaries.

After all, we must face the fact that any extraterrestrials who visited earth possessed technology (and perhaps wisdom) far beyond our own. Treating an advanced technology is a bit like dealing with magic—if you don’t understand the

basic mechanisms, there really is no difference between saying an effect is produced “scientifically,” or simply attributing it to magic or demons. In that situation the words are effectively equivalent. Realizing this, we should be properly humble about what such beings could do. This demands mental flexibility, to say the least.

It might well be that a race capable of journeying among the stars will possess a technology we would not even recognize, much less understand. Add to this the fact that these beings are truly alien—so completely different we cannot even begin to count the ways they may be different—and the problem looks impossible.

I don’t believe things are quite so bad. We needn’t guess every facet of a visitor’s behavior; we only need to check if he has left anything behind as a calling card. The artifact which remains must be recognizable to us as something artificial. Hopefully, if it was constructed by an alien intelligence it will stand out. Even here there are limits, though.

Let’s look, for a moment, at one of the natural world’s most fascinating coincidences. At total eclipse, when our moon moves between us and the sun, a beautiful display occurs. The round moon perfectly overlaps the sun’s disk. Streamers of hot gas are continually boiling up from the sun’s surface, though, and these jets form a bright halo around the moon. This is a remarkable



## Man or Dolphin. Millions of years ago which might have seemed more likely to become the dominant species? For which might the message have been left?

effect, quite dramatic, and no other moon in the solar system provides such a floor show for its planet.

Is this accidental? The moon has not always been in its present orbit, after all; it is moving away from the earth at a rate of about two feet a year. A few hundred thousand years in the past (or the future) this exactly correct overlapping of the sun's and moon's disks would not happen. The eclipse would still be impressive, no doubt, but much less so than now. It is interesting that man's inquiring intelligence has evolved at just the right moment to appreciate this beautiful coincidence.

Or perhaps this additional coincidence—man's rise to civilization and the exact eclipse occurring at the same time—is no coincidence at all. Did some alien visitor predict the evolution of intelligent apes with good accuracy, and leave this massive signpost in our sky? The idea may seem absurd, but it is not impossible. It serves to illustrate that the boundary between artifacts and natural coincidences is blurred.

**S**till, though we cannot anticipate the possible range or accomplishments of an alien technology, we can require that our own knowledge of physical law and information not be violated.

Let's take a simple example. There is a cliché story plot that runs something like this: An alien interstellar expedition runs into trouble and must make an emergency landing on a lush, green, uninhabited planet. There is another disaster; maybe the native animals or bacteria kill most of the ship's crew. All but two of the aliens die. In the closing paragraph we learn that the virgin planet is third from its star, and the two aliens are named Adam and Eve.

This is nonsense for several reasons. The alien body chemistry would have to be exactly like the native life—digesting the same sugars and amino acids, manufacturing blood cells based on hemoglobin, requiring precisely the same vitamins, and so on. This is hard to imagine.

Even worse, how could we then explain the similarities we have with other primates? Did we bring them along, too? Also, fossil evidence shows a clear, continuous line of descent for mankind, all the way from 25 million years ago. Our ancestor Proconsul certainly wasn't smart enough to build a spaceship, and even if he had been, why was he so peculiarly adapted to the ecology of Earth? It simply doesn't fit. We are undeniably the sons of this earth. We

weren't dropped into our niche by accident.

In the same way, we have to be careful about accepting any historical "evidence" of extraterrestrials. We need something more than vague legends about marvelous, miracle-working beings who live in the sky. Virtually all religions, past and present, require that the gods live beneath the earth or above the clouds. (After all, where else could they live—over the next hill? Then an unbeliever could refute an entire theology in an afternoon's walk.) Recent Soviet ethnologists have conjectured that stories from the Bible are garbled versions of alien visits—even that Sodom and Gomorrah were destroyed by an atom bomb. There is simply no evidence for these ideas.

A legend is only a legend. We need something solid and unmistakable before these theories become anything more than armchair speculation.

**A**t various times people have come forward with artifacts that they thought were evidence of alien visits. Some were well-meaning and others outright frauds. A Scotsman thought fused towers in Ireland and Scotland were works of high technology; it turned out they had been fired with peat, a process the Scotsman didn't know about. Etruscan gems were mistakenly taken by

some to be gifts from extraterrestrials, because they seemed strange and sophisticated; they were finally proven to be man-made. Amateur archeologists studied Sahara frescoes and saw what they thought were Martians in helmets. They created quite a stir until it was pointed out that the "helmets" were ritual masks well known in the area for centuries. "Dr. Gurli's Cube," a steel parallelepiped found imbedded in an ancient bed of coal, got quite a lot of press coverage but proved to be a hoax.

Lacking any historical evidence we can be reasonably sure of, we can turn our attention to the possibility that other beings left artifacts on or near the Earth even before (or while) man evolved. In 2001: A Space Odyssey, Clarke and Kubrick called this artifact a "monolith" and endowed it with a decided theological purpose: the uplifting of man. This was a good device for getting across the underlying message of the film, but it is not the only role an artifact could fulfill.

A secondary function of the monoliths was set forth in an early Arthur C. Clarke story, *The Sentinel*. Here the idea was that the aliens left some guidepost or sentinel which would trigger a sign (a warning?) when man reached a certain technological level. This seems reasonable, if our visitors wanted to know immediately when we developed. After all, they might want ample notice that we had discovered atomic bombs or space



travel, rather than learn about it a few centuries from now when we come visiting them.

There is another role an artifact can play, beyond the monolith and the sentinel. Keep in mind that the distances between the stars are vast, our galaxy is many billions of years old, and intelligent races may not live very long in comparison. An alien expedition passing through our solar system long ago might never expect to return, or even to remain in this neighborhood of the galaxy. They may, from experience with other races, know that civilizations do not survive for long on the cosmic time scale, and the chances that Earth would evolve a culture worth knowing while our visitors' society was functioning were quite remote.

Why, then, leave anything behind at all? It is impossible to read the emotions of beings we can neither meet nor understand, but we can guess that the same urge that made them travel among the stars might give them some perspective on the ebb and flow of life in the universe. Perhaps they would leave some sign on the Earth, as if to say *Your intelligence is not alone*. Even more, their artifact might serve as a legacy. In it they could store information, both scientific and "humanistic," which could extend the lifetime of a civilization. Perhaps it would serve as an epitaph for their own race, a kind of last defiant gesture

against the forces of history and entropy that bring down intelligent societies.

*Monolith, sentinel, legacy*—these are only vague guesses, necessarily anthropomorphic ones, at the motivations of superior beings.

Then too, the agency which leaves the artifact may not be a living member of another race at all. The stars might be explored by computerized ships, not flesh and blood.

**S**ending living beings on voyages many light years in length is very expensive and very inefficient, compared to computer-directed flights. NASA's experience indicates that unmanned probes cost a hundredth or a thousandth as much as manned ones. Even a vast, wealthy society would probably prefer to send unmanned ships for exploration, and use members of their own species only on a definite mission (say, colonization) to a known destination.

We must remember the vast time scales that figure into interstellar exploration. Light takes many years to travel from one star to the next. Spaceships, even if they can travel near light speed (a feat we are nowhere near mastering), would take very long indeed to visit the hundred billion stars of our galaxy. Man has been around in identifiable form only about 20 million years. Cro-Magnon man (ourselves) is at least 25,000

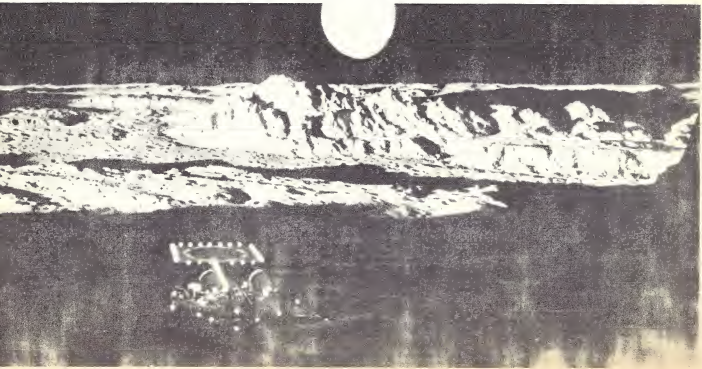
years old. Written records go back 7,000 years. These may seem like long times to us, who are granted only three score and ten. But life has been on Earth for billions of years, and could have aroused the curiosity of a passing computerized spaceship long before man appeared.

If intelligence inevitably arises, once a stable ecology evolves on a planet, the automated visitor might have been under instructions to leave some artifact. Where would he put it?

One obviously safe place is away from Earth entirely, in orbit about the sun. (A billion years ago it might have seemed equally likely that intelligence would evolve on Mars or Earth.) This probe, left behind by the main ship, would wait—drawing power from the sun—until it detected signs of intelligent life on a nearby planet. From such a distance the only reliable evidence would be radio signals, the first indication of what we call modern technology.

If a radio signal ever came, the probe could simply repeat this message, aiming its radio beam back at the source. A computer program could establish a common language, once firm contact was made. This system has the advantage that the probe's radio signal, coming from a nearby orbit, would be much more powerful than a beam from the probe's home star, many light years away. Also, the target planet need not

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# INTERVIEW WITH RAY BRADBURY

Interviewers/Paul Turner and Dorothy Simon

**VERTEX:** Mr. Bradbury, will you tell us something about the Projects you are currently involved in?

**BRADBURY:** Well, the most important one is the casting and production of a play I've been working on for twelve years called "Leviathan 99." This is based on the *Moby Dick* mythology. I think a lot of people are familiar with the fact that nineteen years ago this week I arrived in Ireland to start work on *Moby Dick* as a screen play for John Houston, and I fell deeply in love with Melville. I spent around eight months on it altogether. I've read a lot of Melville in the last nineteen years, and one of the reasons I loved Melville so much was my initial interest in Shakespeare, which started when I was fourteen. I did a lot of Shakespeare in high school and junior high, and have always been influenced by him more than I realized. The result of all this has been a sort of gathering together inside me of these influences. I've hated so much modern theater. I've hated the lack of language. I've hated the lack of poetry, the lack of imagination; It's just incredible to me that theater can exist without this. So when I came back into the theater, I had been out of it for twenty-five or thirty years—I did a lot of acting when I was a teenager—I decided I wanted to bring

poetry back into the theater. So, most of my plays are plays which have a lot to do with language, with returning the metaphor to the center of the stage. In other words, you can do any of my plays with no scenery, no costumes, no props. It's what Shakespeare was up to and it's what a heck of a lot of the Japanese theater is up to.

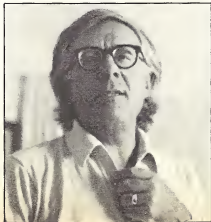
**VERTEX:** That was pretty much what your play *The Wonderful Ice Cream Suit* was up to.

**BRADBURY:** Sure you can stage that—all you need is ice cream suits for the people, and for the rest we've used pro-

jections. But anyway, over the years it was inevitable that *Moby Dick* would come back into my life. I'm very proud of the film, with all its flaws, and the good lord knows it has many. But nevertheless, there is much of beauty and distinction about the film. I was very pleased to work with Houston. But, over the years there has been this fermentation of the symbols. Then about twelve years ago I decided to do a very brave and foolish thing, which was to write a novel based on the *Moby Dick* mythology and concerned with the influences of Shakespeare upon, not only myself, but, Melville. All of *Moby Dick* is permeated with Shakespeare. In fact, the book was thrown out and done over by Melville after Shakespeare came into his life. He had already done one version of it when someone gave him a set of Shakespeare with readable type, which was rare in those days a hundred years ago. Melville fell completely under the spell of Hamlet and Othello, and Richard the third and King Lear, and rewrote *Moby Dick* in those terms. And now, very late in time, it's kind of a wonderful series of events to me that Shakespeare and Melville have birthed a bastard son in me, and I'm doing this foolish thing which I hope will be either the best thing I've ever done or the worst. But that's the kind of thing you want to experiment with; it's no fun if you do something safe.

**VERTEX:** How soon do you think your play will be produced?

**BRADBURY:** Well, we've been casting now for two weeks and we've interviewed five hundred actors to cast fourteen roles. The hardest part to cast, of course, is the captain, who is the personification of Ahab in the future, two hundred years from now. And, of course, it is about a great white comet that comes down to our part of the universe once every thirty years, and this captain who has had his eyes put out by the comet when he was a young man; and now, very late in time, he goes out in space to doom that thing which doomed him. So I am sure you can see just from that brief description that it is taking all the symbols of Melville and putting them ahead 200 years into our future, and all the sailing ships become rocket ships, and all the sailing men become astronauts and it gives you then a wonderful springboard starting with "Call me Ishmeal" to just go and leap into space. In the entire play there are perhaps 50 words from Melville, 50 direct quotations like "Call me Ishmeal." "It is a cold, damp, dreary November in my





soul." Outside of that there is nothing of Melville except his immense influence, and the rest is my experimentation with verse and trying to make sense of this mythology in new terms. I did another brave thing which no one else has ever thought to do, and I don't know why not. I went to the head of the Samuel Goldwyn Studios here, and I said to them, "Hey, isn't it peculiar that in the entire history of motion pictures, 70 years or so, nobody has ever thought to go to a major studio and put on a play on a sound stage. What a beautiful place to put on a play! And it's never been done. So," I said, "why don't you rent me a sound stage at a reasonable rate, 'cause I can't afford to pay \$1,000.00 a day which is what some sound stages rent for, or even \$2,000.00 a week. We don't have that kind of money. Why don't you give me a sound stage and let me put on my play?" And the head of the studio brooded for a moment, and I said, "Hey, do you have any teenagers at home?" And he said, "Yes, I have two." And I said, "O.K. Wouldn't it be nice if you could go home tonight and tell your teenagers you're putting on a Ray Bradbury play at the studio, and you're giving me space." He says, "You've got it!" So that's how I got the studio, by being that outrageous. Sure, that's egotistical, but it's also knowing when the time has come to try to do certain things. And so now we've moved into the studio. They've been wonderful to us. We're going to fill that sound stage with outer space, with stars, with nebulae, with the great Andromeda Nebula, with slide projections, done by Joe Mugnani, who has illustrated many of my books now, has done covers for many of them. So, again, we'll use basically an empty stage with a few risers and high places where you can indicate where the Captain is walking on the outside of the rocket ship at

night, looking at the stars and speaking to the comet that's coming down through space, and the rest we'll fill in. The great thing about working in a studio is that it automatically looks, when you walk in, like a hangar down at Cape Kennedy. So you have this given feeling of being in the environment of the astronauts, and when the audience is in then we slide that big hangar door shut, you know, with electronic music and sound, and that alone is an event before you even begin the play.

**VERTEX:** Sounds like a beautiful event.  
**BRADBURY:** Oh, it could be a mess! And I hope to get Lalo Schiffrin to write a little piece of music in the middle of the drama, only about a minute long. There's a section where I have the character of Quel, who is the equivalent of Queequeg, the far islander in *Moby Dick*. Well, Quel, in my story, is an islander from Andromeda, many light years away, and in the middle of my drama he hears, rolling across the shore of space, this symphony, a funeral dirge written by his great-grandfather, and this is broadcast across space and Quel hears it and goes into a trance and then decides to give up life. It's his warning, similar to the warning seen by Queequeg in *Moby Dick* of the rolling the bones and forecasting their doom. And so, in this case, you set up a fascinating situation and you go to a composer like Lalo Schiffrin and you say, "Write me a symphony that doesn't sound like a symphony. Write me a piece of music that doesn't sound like music." How do you do that? You have to use some clichés, somewhere. Electronic music has turned into an immense cliché now. What is new? Nothing is new. It's going to be a fascinating challenge for Lalo, who has done a lot of electronic scoring. Of course, he's one of the best people in the world. Where do you go from here? What do you do that hasn't been done and done a million times. I think I have ways, I hope I can find ways with Schiffrin to solve the problem and indicate something that is like music that will, I hope, chill the audience and make them believe what we're saying.

**VERTEX:** That's a very short period of time, isn't it, to compose a piece of music like that.

**BRADBURY:** You mean the time between now and when we open?

**VERTEX:** Yes.

**BRADBURY:** Well, most composers work very much as I do. Everything I do is done quickly. Nothing comes of doing slow work. I've never known any good writers who wrote slowly. It's rare

in the history of the world that any good writing has ever been done slowly. Emotion must carry the day, and then seeded within the emotion is the intellectual content. If you start thinking about a thing you ruin it, you destroy it. You're self-conscious, you're pontificating, you're trying to please various groups of your friends or please some secret part of yourself which has nothing to do with the creative act. So, by being emotional, by being immediate, by being quick, you are very truthful, and that applies to music, too. So Lalo will either do it the first time out or he won't do it at all. Just as most of the good stuff in this play was written the first time through. I experimented in the novel form 12 years ago, and then I shifted over into turning it into a radio drama 5 years ago. There are no networks left in the United States, of course. There's nowhere to broadcast radio drama anymore, which is a great shame. So I sent it over to England and it was broadcast on the BBC, 4 years ago, and was very successful. It got wonderful reviews. An hour and 15 minute radio show, starring Christopher Lee, of all people, who played the Captain and played it beautifully. But my first time through the good speeches came for my people. If you try to push too hard then it begins to turn into rhetoric, empty pontification, so I think Lalo will probably do it the first time he sits down, and probably do it in 5 minutes, and it will be beautiful.

**VERTEX:** Can I ask you what other projects you're involved in, besides this play?

**BRADBURY:** Of course. I just had my *Halloween Tree* published, which took 5 years. A history of Halloween, in novel form. I'm very pleased with it. Again, it was a lot of fun, it was a wonderful adventure. I got the idea . . . well, I did





Ray Bradbury is the complete man of letters. Author, screen scenarist, poet, playwright, critic, commentator, and much more. His views on life today—and tomorrow—are as far ranging, and sometimes controversial, as the science fiction for which he has won such critical acclaim.

a painting 12 years ago. I'm a Sunday painter but I only paint maybe once a year. I'm not all that good. I can't paint people so I paint scenes. That Dandelion Wine illustration up here on the wall is mine. That's easy to do though; it's just a dandelion in the middle of a field. So it's a nice safe thing. But I did a thing called *The Halloween Tree*, which was a huge wonderful October tree full of pumpkins with faces and an autumn creature lying under the tree. Well, this was 12 years back, long before *The Great Pumpkin*, *Charlie Brown*. I've had the picture around for years and I went over and had a meeting with Chuck Jones, the cartoonist and animator, a couple of years ago, and he wanted to do a film with me and we liked each other very much. He's a lovely person. So we got to kicking ideas around. I said "I've always wanted to do something about Halloween." And he said he had too and then I showed him this painting and he said, "Gosh, that's great! Why don't we do something called *The Halloween Tree* and do a 90 minute animated film." So MGM hired me and I worked for a number of months and did a lot of research on Halloween and discovered along the way there are almost no books that have ever been published on Halloween in any country of the world. It's a totally empty field. You know, people are always looking, saying that there's nothing new to write; well, there's so much that hasn't been touched and that's a whole area. The last serious book on Halloween was published in 1918. That's a long time ago. So, here I've got the field all to myself. If I do a little research on the Druid origins of Halloween, the Greek origins, the Roman, the Egyptian; then coming over from Ireland and from the Druid origins to Latin America and what still goes on in Latin countries on The Day of the Dead. So I take eight kids and send them on excursions into the past with Mr. Monstrous, who is death personified, to find out what Halloween is all about. Why we love it so dearly. Why it stands in the center of many of our lives. It's certainly my favorite holiday. I prefer it to Christmas.

**VERTEX:** Are you also involved in writing a screen play?

**BRADBURY:** Yes, I'm doing *Something Wicked This Way Comes* for Sam Peckinpaw, who wants to do the film. A lot of people when they hear this say, "My God, what are you doing with Sam Peckinpaw? Have you seen *The Wild Bunch*?" And I say, "Yes." "Well, have you seen *Straw Dogs*?" And I say, "Yes." And they say, "Gosh, is he going to make

a violent film out of your *Something Wicked This Way Comes*?" And I say, "No, of course he isn't." He is one of the best professional artistic directors in the world, and he is going to make the book. The first thing he said when we sat down at lunch a year ago was, "We shoot the book." And I said, "Do you mean it? Don't tell me that if you don't mean it because I'll weep, otherwise." He says, "Don't worry, I love it completely." He had meetings with several studio people recently and the studio people said, "Well, what are you going to do?" He said, "I'm going to rip the pages out of the book and I'm going to stuff them in the camera; I'm going to shoot everything that's there." So he's dedicated and we get on fine. There's no telling what the future is going to bring, but I have good feelings. You know you get these vibrations about people and they've rarely been wrong in my life. I've made all the basic decisions in life from my stomach, not my head. I go by my intuitions. I have these wonderfully good feelings when I sit with him, when I'm with this man. The vibrations that come off of him are terrific, so I've got to go with that, that's all, there's nothing I can intellectualize about. I feel we're going to make a good film.

**VERTEX:** Let me ask you another question, to change the subject a little bit. What is your favorite science fiction story?

**BRADBURY:** Oh . . . among all of the science fiction writings of all time?

**VERTEX:** Yes.

**BRADBURY:** That's very hard . . .

**VERTEX:** I know it's an unfair question!

**BRADBURY:** It would have to be somewhere between H. G. Wells and Jules Verne. I keep going back, especially to Verne over the years. He was such a remarkable man and he is such an influence on all of our lives. You know, one of the men who invented the first really practical submarine was influenced by Verne. I think he read something of Verne's when he was 12 or 15 years old and said, "I will grow up and then I will build Nemo's submersible craft." I always love to quote Admiral Bird when he went to the North Pole for the first time, he said, "Jules Verne leads me." Isn't that a beautiful quote? It gives me prickles on the back of my head. I think Jules Verne leads a lot of people. He certainly influenced me, as did Wells. The great thing about Verne in things like *Twenty Thousand Leagues Under the Sea*, and *Mysterious Island*, and *Around the World in Eighty*

Days is that he made you proud of being a human being. This is the thing that's been lost in so many pieces of fiction, and this day and age when there's a lot to criticize and there's a lot not to be proud of. But we should never let it overwhelm us to the point of where we find ourselves completely despicable. That way we can never change anything, that way we're hopeless, everything is lost. So someone like Verne comes along and says, "O.K. Things are rough. They have always been rough. This is not the roughest time in the history of the world." The time that Verne lived in was far rougher. The bubonic plague was still in the world, which could decimate a country in 3 days. Millions of people died in 1 week. We've never had the problems this particular 30 year period that they had 100 years ago. A simple thing like having a tooth extracted could kill you. The merest pain in your body destroyed you within a week. Appendicitis just flipped you right out of the world. It was a dreadful time. All of the other times before our times were worse than ours. So, we do have many things, and if Verne were alive, Jesus Christ, he'd be walking around saying, "Don't you see what you have here? You're remarkable people. It's a remarkable age." Plenty wrong, plenty wrong, by all means criticize. But the great thing Verne said was, "You have a heart; feel with it. Look at the world and feel with this thing. You have a head with which to intellectualize and improve on things of the heart. And you have hands; use them. Change the world, make it better." That's a great message and it always will be great.

**VERTEX:** What about your own stories? Which story of yours do you like best? Another unfair question.

**BRADBURY:** No, I have favorite short stories. My favorite short story is *There Will Come Soft Rains*, from the *Martian Chronicles*. The story about the mechanical house that goes on living after the hydrogen bomb falls. And my favorite book is *Something Wicked This Way Comes*, which is a very personal book and I suppose the reason I love it especially is it is a tribute to my father. He's the hero of the book. My father's been dead 15 years, this month. There isn't a day in my life I haven't missed him terribly. I loved him deeply. I finished the book 10 years ago, published it 10 years ago, and about 8 years ago I reread it one night and discovered that my father was the hero. I then began to cry and I suddenly realized that I'd put him in the book and I didn't know that I

had. He's the father of the boy who saves everyone with his love. It's kind of great to build a monument to your father, and not know it, then come upon it by accident, and weep. I suppose that book will always be very special and very much prized by me.

**VERTEX:** Is there a chance that *Martian Chronicles* is going to get filmed?

**BRADBURY:** Well, some people are supposed to fly here from London in the next few weeks to talk to me about it. It's been owned by 3 studios now. MGM owned it 12 years ago. I did one screen play for them. Pakula-Mulligan owned it for a year. I did a screen play for them. Kirk Douglas owned it for 6 months, 15 years ago. He was going to do it as a TV series—thank God that never got underway. In those days they weren't spending *anything* to make a decent TV series and, for that matter, they don't spend enough today.

**VERTEX:** While we're on the subject of films, how did you like the film production of *The Illustrated Man*?

**BRADBURY:** I hated it. The director did a very bad job of directing, Jack Smythe; and the screen play by the producer, Howard Krisic, was . . . I guess dreadful is the best word. It was written without conferring with me. It was written behind my back. I didn't see the screenplay until several weeks before the film was commencing. They didn't really want me to see it, of course, or else they would have showed it to me months ahead. I could have sat down and in 48 hours corrected most of the things that were wrong with the script. I couldn't have perfected it in 48 hours, but I could have taken out a lot of the really bad stuff with a red pencil, and indicated things to be done. I said this to Jack Smythe—while he was shooting the film—I went on the set and looked around. It was a beautiful set, the one they did for the veldt, quite well put together and very impressive—and I said, "Gosh, do you have any plans to make this house part of the feeling of villainy?" In other words, these people are letting the house own them, in a way. The house is taking over; the room is taking over. And because the parents are spineless wonders they've let the room take over, sort of dominate the children's lives. They can't get through to the kids and they really don't want to, or they would. We all know that about love. If you really care about people, you *care* about them. And I said, "Let your camera prowl around the house at night and look in all the rooms, look in the empty rooms. Let the camera examine their life,

without words. You've got too many words in here from the little of the screenplay I've seen. But let the camera prowl around, look in the various rooms where people are sleeping, and then finally come into the room where the veldt is and the camera goes and stands, like a person, and looks in; and the vultures are still in the trees, and that sun is still in the sky, and the lions are still on the long grass—they won't go away. It's twilight on the veldt but they won't go away. They've been told to go away but they won't." I think this would have been chilling. It would have been a great scene. But did anyone listen? Hell, no, they didn't! So it's a bad film.

**VERTEX:** What films do you think are good? What films do you like?

**BRADBURY:** Things like *Fantasia*, which came out 32 years ago. I was selling newspapers on the street corner at the time, and I lived in terror that I would die before that film opened. I could smell it coming. God! I was careful, crossing the street and selling newspapers. That's the kind of hysteria I've always been in my enthusiasms. I've tried to keep that thing going. I think you should live every day with that feeling. I can hardly wait for this thing to happen; I can hardly wait for that thing to happen. If you can latch on to things in the immediate future in your own life, and in the various arts, that sound exciting—there's not that much around, most of the time, of course. It gets harder, the older you get, to find those things that you wait for and anticipate. Recently I had that sort of anticipation for *Don Juan in Hell*, which I had seen 20 years ago. I'm a big Shaw fan and I could hardly wait to see *Don Juan* again. It's one of the great plays; it's a beautiful evening; it's hard to destroy that play. I've always had very good taste; I've always had damn good taste in films. I knew the masterworks instantly, when I saw them. I binged all my friends over the head and dragged them screaming out to see *Fantasia*. Same thing with *Citizen Kane*. As soon as it opened, I knew it was going to be around forever. I've never needed to have anyone else tell me what to see. That's a lot of crap. I don't listen to anyone. I've always gone on my own terms; I've never been intellectually bullied by anyone. I have my own taste and it turns out, over the years, it's been damn good. Films like *Singing in the Rain* I've seen 25 times. It's one of the great musicals. Films like *Funny Face*, with Audrey Hepburn and Astaire. Those two musicals—superb, superb! So

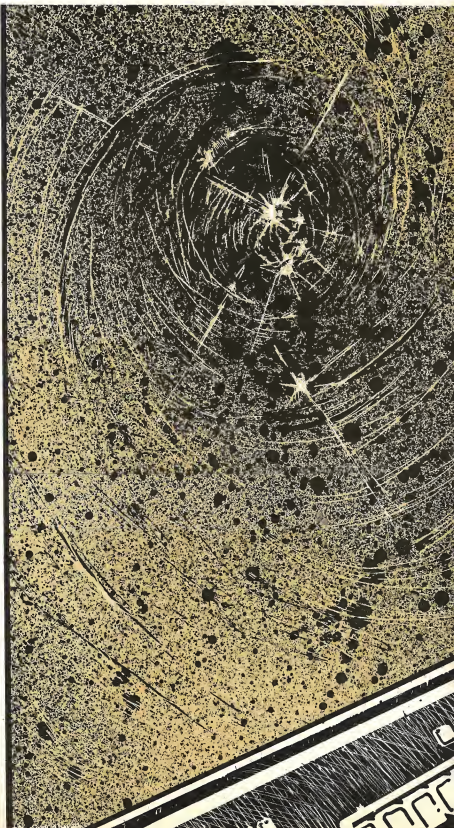
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# The Dance Of The Changer And The Three

fiction/Terry Carr

This all happened ages ago, out in the depths of space beyond Dark-edge, where galaxies lumber ponderously through the black like silent bright rhinoceroses. It was so long ago that when the light from Loarr's galaxy finally reached Earth, after millions of light-years, there was no one here to see it except a few things in the oceans which were too mindlessly busy with their monotonous single-celled reactions to notice.

Yet as long ago as it was, the present-day Loarra still remember this story and retell it in complex, shifting wave-dances every time one of the Newly-Changed asks for it. The wave-dances wouldn't mean much to you if you saw them, nor I suppose would the story itself if I were to tell it just as it happened. So consider this a translation, and don't bother yourself that when I say "water" I don't mean our hydrogen-oxygen compound, nor that there's no "sky" as such on Loarr, nor for that matter that the Loarra weren't—aren't—creatures that "think" or "feel" in quite the way we understand. In fact, you could take this as a piece of pure fiction, because there are damned few real facts in it—but I know better (or worse), because I know how true it is. And that has a lot to do with why I'm back here on Earth, with forty-two friends and co-workers left dead on Loarr. They never had a chance.







**T**here was a Changer who had spent three life-cycles planning a particular cycle-climax and who had come to the moment of action. He wasn't really named Minnearo, but I'll call him that because it's the closest thing I can write down to approximate the tone, emotional matrix and associations that were all wrapped up in his designation.

When he came to his decision, he turned away from the crag on which he'd been standing overlooking the Loarran ocean, and went quickly to the personality-homes of three of his best friends. To the first friend, Asterrea, he said, "I am going to commit suicide," wave-dancing this message in his best festive tone.

His friend laughed, as Minnearo had hoped, but only for a short time. Then he turned away and left Minnearo alone, because there had already been several suicides lately and it was wearing a little thin.

To his second friend, Minnearo gave a pledge-salute, going through all sixty sequences with exaggerated care, and wave-danced, "Tomorrow I shall immerse my body in the ocean, if anyone will watch."

His second friend, Fless, smiled tolerantly and told him he would come and see the performance.



*How can an Earthman have anything in common with an alien? How can he even be sure, after communication has been established, that they are even talking about the same things? What possible meeting ground can there be? Especially when the aliens don't even care whether or not you understand them?*



To his third friend, with many excited leapings and boundings, Minnearo described what he imagined would happen to him after he had gone under the lapping waters of the ocean. The dance he went through to give this description was intricate and even imaginative, because Minnearo had spent most of that third life-cycle working it out in his mind. It used motion and color and sound and another sense something like smell, all to communicate descriptions of falling, impact with the water, and then the quick dissolution and blending in the currents of the ocean, the dimming and loss of awareness, then darkness, and finally the awakening, the completion of the Change. Minnearo had a rather romantic turn of mind, so he imagined himself recoallescing around the life-mote of one of Loarr's greatest heroes, Krollim, and forming on Krollim's old pattern. And he even ended the dance with suggestions of glory and imitation of himself by others, which was definitely presumptuous. But the friend for whom the dance was given did nod approvingly at several points.

"If it turns out to be half what you anticipate," said this friend, Pur, "then I envy you. But you never know."

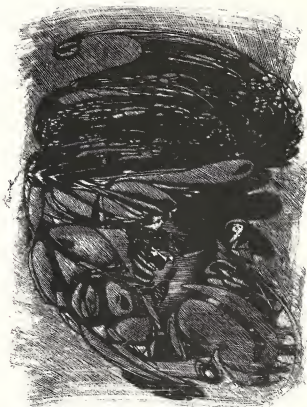
"I guess not," Minnearo said, rather morosely. And he hesitated before leaving, for Pur was what I suppose I'd better call female, and Minnearo had rather hoped that she would join him in the ocean-jump. But if she thought of it she gave no sign, merely gazing at Minnearo calmly, waiting for him to go, so finally he did.

And at the appropriate time, with his friend Fless watching him from the edge of the cliff, Minnearo did his final wave-dance as Minnearo—a rather excited, ill-coordinated thing in places, but that was understandable in the circumstances—and then performed his approach to the edge, leaped and tumbled downward through the air, making fully two dozen turns this way and that before he hit the water.

Fless hurried back and described the suicide to Asterrea and Pur, who laughed and applauded in most of the right places, so on the whole it was a success. Then the three of them sat down and began plotting Minnearo's revenge.

All right, I know a lot of this doesn't make sense. Maybe that's because I'm trying to tell you about the Loarra in human terms, which is a mistake with creatures so alien as they are. Actually, the Loarra are almost wholly an energy

*"For long minutes they hung in midair, whirling and darting in their most tightly linked patterns while the storm whipped them and the vortex pulled them."*



life-form, their consciousnesses coallescing in each life-cycle around a spatial center which they call a "life-mote," so that, if you could see the patterns of energy they form (as I have, using a sense-filter our expedition developed for that purpose), they'd look rather like a spiral nebula sometimes, or other times like iron filings gathering around a magnet, or maybe like a half-melted snowflake. (That's probably what Minnearo looked like on that day, because it's the suicides and the aged who look like that.) Their forms keep shifting, of course, but each individual usually keeps close to one pattern.

Loarr itself is a gigantic gaseous planet with an orbit so close to its primary that its year is only about thirty-seven Earth-standard Days long. (In Earthsystem, the orbit would be considerably inside that of Venus.) There's a solid core to the planet, and a lot of hard outcroppings like islands, but most of the surface is in a molten or gaseous state, swirling and bubbling and howling with winds and storms. It's not a very inviting planet if you're anything like a human being, but it does have one thing which brought it to Unicentral's attention: mining.

Do you have any idea what mining is like on a planet where most metals are fluid from the heat and/or pressure? Most people haven't heard much about this, because it isn't a situation we encounter often, but it was there on Loarr,

and it was very, very interesting. Because our analyses showed some elements that had been until then only computer-theory—elements which were supposed to exist only in the hearts of suns, for one thing. And if we could get hold of some of them . . . well, you see what I mean. The mining possibilities were very interesting indeed.

Of course, it would take half the wealth of Earthsystem to outfit a full-scale expedition there. But Unicentral hummed for two-point-eight seconds and then issued detailed instructions on just how it was all to be arranged. So there we went.

And there I was, a Standard Year later (five Standard Years ago), sitting inside a mountain of artificial Earth welded onto one of Loarr's "islands" and wondering what the hell I was doing there. Because I'm not a mining engineer, not a physicist or comp-technician nor, in fact, much of anything that requires technical training. I'm a glorified salesman, otherwise called a public relations man, and there was just no reason for me to have been assigned to such a hellish, impossible, godforsaken, inconceivable and plain damned unlivable planet as Loarr.

But there was a reason, and it was the Loarra, of course. They lived ("lived") there, and they were intelligent, so we had to negotiate with them. Ergo: me.

So in the next several years, while I

negotiated and we set up operations and I acted as go-between, I learned a lot about them. Just enough to translate, however clumsily, the wave-dance of the Changer and the Three, which is their equivalent of a classic folk-hero myth (or would be if they had anything honestly equivalent to anything of ours).

To continue:

Fless was in favor of building a pact between the Three by which they would, each in turn and each with deliberate lack of the appropriate salutes, commit suicide in exactly the same way Minnearo had. "Thus we can kill this suicide," Fless explained in excited waves through the air.

But Pur was more practical. "Thus," she corrected him, "we would kill *only* this suicide. It is unimaginative, a thing to be done by rote, and Minnearo deserves more."

Asterrea seemed undecided; he hopped about, sparking and disappearing and reappearing inches away in another color. They waited for him to comment, and finally he stabilized, stood still in the air, settled to the ground and held himself firmly there. Then he said, in slow, careful movements, "I'm not sure he deserves an original revenge. It wasn't a new suicide, after all. And who is to avenge us?" A single spark leapt from him. "Who is to avenge us?" he repeated, this time with more pronounced motions.

"Perhaps," said Pur slowly, "we will need no revenge—if our act is great enough."

The other two paused in their random wave-motions, considering this. Fless shifted from blue to green to a bright red which dimmed to yellow; Asterrea pulsed a deep ultraviolet.

"Everyone has always been avenged," Fless said at last. "What you suggest is meaningless."

"But if we do something *great* enough," Pur said; and now she began to radiate heat which drew the other two reluctantly toward her. "Something which has never been done before, in *any* form. Something for which there can be no revenge, for it will be a *positive* thing—not a death-change, not a destruction or a disappearance or a forgetting, even a great one. A *positive* thing."

Asterrea's ultraviolet grew darker, darker, until he seemed to be nothing more than a hole in the air. "Dangerous, dangerous, dangerous," he droned, moving torpidly back and forth. "You know it's impossible to ask—we'd have

to give up all our life-cycles to come. Because a positive in the world . . ." He blinked into darkness, and did not reappear for long seconds. When he did he was perfectly still, pulsating weakly but gradually regaining strength.

Pur waited till his color and tone showed consciousness had returned, then moved in a light wave-motion calculated to draw the other two back into calm, reasonable discourse. "I've thought about this for six life-cycles already," she danced. "I must be right—no one has worked on a problem for so long. A positive would *not* be dangerous, no matter what the three- and four-cycle theories say. It would be beneficial." She paused, hanging orange in midair. "And it would be *new*," she said with a quick spiral. "Oh, how *new*!"

And so, at length, they agreed to follow her plan. And it was briefly this: On a far island outcropping set in the deepest part of the Loarran ocean, where crashing, tearing storms whipped molten metal-compounds into blinding spray, there was a vortex of forces which was avoided by every Loarra on pain of instant and final death-change. The most ancient wave-dances of that ancient time said that the vortex had always been there, that the Loarra themselves had been born there, or had escaped from there, or had in some way cheated the laws that ruled there. Whatever the truth about that was, the vortex was an eater of energy, calling and catching from afar any Loarra or other beings who strayed within its influence. (For all the life on Loarr is energy-based, even the mindless, drifting foodbeasts—creatures of uniform dull color, no internal motion, no scent or tone and absolutely no self-volution. Their place in the Loarran scheme of things is and was literally nothing more than that of food, so even though there were countless foodbeasts drifting in the air in most areas of the planet, the Loarra hardly ever noticed them. They ate them when they were hungry, and looked around them at any other time.)

"Then you want us to destroy the *vortex*?" cried Fless, dancing and dodging to right and left in agitation.

"Not *destroy*," Pur said calmly. "It will be a *life-change*, not a destruction."

"Life-change?" said Asterrea faintly, wavering in the air.

And she said it again: "Life-change." For the vortex had once created, or somehow allowed to be created, the Oldest of the Loarra, those many-cycles-ago beings who had combined and split, reacted and Changed countless times to

become the Loarra of this day. And if creation could happen at the vortex once, then it could happen again.

"But how?" asked Fless, trying now to be reasonable, dancing the question with precision and holding a steady green color as he did so.

"We will need help," Pur said, and went on to explain that she had heard—from a Windbird, a creature with little intelligence but perfect memory—that there was one of the Oldest still living his first life-cycle in a personality-home somewhere near the vortex. In that most ancient time of the race, when suicide had been considered extreme as a means of cycle-change, this Oldest had made his Change by a sort of negative suicide—he had frozen his cycle, so that his consciousness and form continued in a never-ending repetition of themselves, on and on while his friends changed and grew and learned as they ran through life-cycle after life-cycle, becoming different people with common memories, moving forward into the future by this method while he, the last Oldest, remained fixed at the beginning. He saw only the beginning, remembered only the beginning, understood only the beginning.

And for that reason his had been the most tragic of all Loarran Changes (and the Windbird had heard it rumored, in eight different ways, each of which it repeated word-for-word to Pur, that in the ages since that Change more than a hundred hundred Loarra had attempted revenge for the Oldest, but always without success), and it had never been repeated, so that this Oldest was the only Oldest. And for that reason he was important to their quest, Pur explained.

With a perplexed growing and shrinking, brightening and dimming, Asterrea asked, "But how can he live anywhere near the vortex and not be consumed by it?"

"That is a crucial part of what we must find out," Pur said. And after the proper salutes and rituals, the Three set out to find the Oldest.

The wave-dance of the Changer and the Three traditionally at this point spends a great deal of time, in great splashes of color and bursts of light and subtly contrived clouds of darkness all interplaying with hops and swoops and blinking and dodging back and forth, to describe the scene as Pur, Fless and Asterrea set off across that ancient molten sea. I've seen the dance countless

times, and each viewing has seemed to bring me maddeningly closer to understanding the meaning which this has for the Loarra themselves. Lowering clouds flashing bursts of aimless, lifeless energy, a rumbling sea below, whose swirling depths pulled and tugged at the Three as they swept overhead, darting around each other in complex patterns like electrons playing cat's-cradle around an invisible nucleus. A droning of lamentation from the Changers left behind on their rugged home island, and giggles from those who had recently Changed. And the colors of the Three themselves: burning red Asterrea and glowing green Fless and steady, steady golden Pur. I see and hear them all, but I feel only a weird kind of alien beauty, not the grandeur, excitement and awesomeness which they have for the Loarra.

When the Three felt the vibrations and swirlings in the air that told them they were coming near to the vortex, they paused in their flight and hung in an interpatterned motion-sequence above the dark, rolling sea, conversing only in short flickerings of color because they had to hold the pattern tightly in order to withstand the already-strong attraction of the vortex.

"Somewhere near?" asked Asterrea, pulsing a quick green.

"Closer to the vortex, I think," Pur said, chancing a sequence of reds and violets.

"Can we be sure?" asked Fless; but there was no answer from Pur and he had expected none from Asterrea.

The ocean crashed and leapt; the air howled around them. And the vortex pulled at them.

Suddenly they felt their motion-sequence changing, against their wills, and for long moments all three were afraid that it was the vortex's attraction that was doing it. They moved in closer to each other, and whirled more quickly in a still more intricate pattern, but it did no good. Irresistibly they were drawn apart again, and at the same time the three of them were moved toward the vortex.

And then they felt the Oldest among them.

He had joined the motion-sequence, and this must have been why they had felt the sequence changed and loosened—to make room for him. Whirling and blinking, the Oldest led them inward over the frightening sea, radiating warmth through the storm, and as they followed, or were pulled along, they

studied him in wonder.

He was hardly recognizable as one of them, this ancient Oldest. He was . . . not quite energy any longer. He was half matter, carrying the strange mass with awkward, aged grace, his outer edges almost rigid as they held the burden of his congealed center and carried it through the air. (Looking rather like a half-dissolved snowflake, yes, only dark and dismal, a snowflake weighted with coal-dust.) And, for now at least, he was completely silent.

Only when he had brought the Three safely into the calm of his barren personality-home on a tiny rock jutting at an angle from the wash of the sea did he speak. There, inside a cone of quiet against which the ocean raged and fell back, the winds faltered and even the vortex's power was nullified, the Oldest said wearily, "So you have come." He spoke with a slow waving back and forth, augmented by only a dull red color.

To this the Three did not know what to say; but Pur finally hazarded, "Have you been waiting for us?"

The Oldest pulsed a somewhat brighter red, once, twice. He paused. Then he said, "I do not wait—there is nothing to wait for." Again the pulse of brighter red. "One waits for . . . the future. But there is no future, you know."

"Not for him," Pur said softly to her companions, and Fless and Asterrea sank wavering to the stone floor of the Oldest's home, where they rocked back and forth.

The Oldest sank with them, and when he touched down he remained motionless. Pur drifted over the others, maintaining movement but unable to raise her color above a steady blue-green. She said to the Oldest, "But you knew we would come."

"Would come? *Would* come? Yes, and *did* come, and *have* come, and *are* come. It is today only, you know, for me. I will be the Oldest, when the others pass me by. I will never change, nor will my world."

"But the others have already passed you by," Fless said. "We are many life-cycles after you, Oldest—so many it is beyond the count of Windbirds."

The Oldest seemed to draw his material self into a more upright posture, forming his energy-flow carefully around it. To the red of his color he added a low hum with only the slightest quaver as he said, "Nothing is after me, here on Rock. When you come here, you come out of time, just as I have. So now you have always been here and will always be here, for as long as you are

here."

Asterrea sparked yellow suddenly, and danned upward into the becalmed air. As Fless stared and Pur moved quickly after him to calm him, he drove himself again and again at the edge of the cone of quiet that was the Oldest's refuge, each time was thrown back and each time returned to dash himself once more against the edge of the storm, trying to penetrate back into it. He flashed and burned countless colors, and strange sound-frequencies filled the quiet, until at last, with Pur's stern direction and Fless's blank gaze upon him, he sank back wearily to the stone floor. "A trap, a trap," he pulsed. "This is it, this is the vortex itself, we should have known, and we'll never get away."

The Oldest had paid no attention to Asterrea's display. He said slowly, "And it is because I am not in time that the vortex cannot touch me. And it is because I am out of time that I know what the vortex is, for I can remember myself born in it."

Pur left Asterrea then, and came close to the Oldest. She hung above him, thinking with blue vibrations, then asked, "Can you tell us how you were born?—what is creation?—how new things are made?" She paused a moment, and added, "And what *is* the vortex?"

The Oldest seemed to lean forward, seemed tired. His color had deepened again to the darkest red, and the Three could clearly see every atom of matter within his energy-field, stark and hard. He said, "So many questions to ask one question." And he told them the answer.

And I can't tell you that answer, because I don't know it. No one knows it now, not even the present-day Loarra who are the Three after a thousand million billion life-cycles. Because the Loarra really do become different . . . different "persons," when they pass from one cycle to another, and after that many changes, memory becomes meaningless. ("Try it sometime," one of the Loarra once *wave-danced* to me, and there was no indication that he thought this was a joke.)

Today, for instance, the Three themselves, a thousand million billion times removed from themselves but still, they maintain, *themselves*, often come to watch the Dance of the Changer and the Three, and even though it is about them they are still excited and moved by it as though it were a tale never even heard before, let alone lived through. Yet let a dancer miss a movement or color or

*"They flashed in over us like locusts descending, and they hit the crawlers and dredges first. The metal glowed red, then white, then it melted."*



sound by even the slightest nuance, and the Three will correct him. (And yes, many times the legendary Changer himself, Minnearo, he who started the story, has attended these dances—though often he leaves after the recreation of his suicide-dance.)

It's sometimes difficult to tell one given Loarra from all the others, by the way, despite the complex and subtle technologies of Unicentral, which have provided me with sense-filters of all sorts, plus frequency simulators, patternscopes, special gravity inducers and a minicomp that takes up more than half of my very tight little island of Earth pasted onto the surface of Loarr and which can do more thinking and analyzing in two seconds than I can do in fifty years (even good years, of which I haven't had any lately). During my four years on Loarr, I got to "know" several of the Loarra, yet even at the end of my stay I was still never sure just who I was "talking" with at any time. I could run through about seventeen or eighteen tests, linking the sense-filters with the minicomp, and get a definite answer that way, but Loarra are a bit short on patience and by the time I'd get done with all that whoever it was would usually be off bouncing and sparking into the hellish vapors they call air. So usually I just conducted my researches or negotiations or idle queries, whichever they were that day, with whoever would pay

attention to my antigrav "eyes," and I discovered that it didn't matter much just who I was talking with: none of them made any more sense than the others. They were all, as far as I was and am concerned, totally crazy, incomprehensible, stupid, silly and plain damn No Good.

If that sounds like I'm bitter, it's because I am. I've got forty-two reasons to be bitter: forty-two murdered men. But back to the unfolding of the greatest legend of an ancient and venerable alien race:

**W**hen the Oldest had told them what they wanted to know, the Three came alive with popping and flashing and dancing in the air, Pur just as much as the others. It was all that they had hoped for and more; it was the entire answer to their quest and their problem. It would enable them to Create, to transcend any negative cycle-climax they could have devised.

After a time, the Three came to themselves and remembered the rituals.

"We offer thanks in the name of Minnearo, whose suicide we are avenging." Fless said gravely, waving his message in respectful deep blue spirals.

"We thank you in our own names as well," said Asterrea.

"And we thank you in the name of no one and nothing," said Pur, "for that

is the greatest thanks conceivable."

But the Oldest merely sat there, pulsing his dull red, and the Three wondered among themselves. At last the Oldest said, "To accept thanks is to accept responsibility, and in only today, as I am, there can be none of that because there can be no new act. I am outside time, you know, which is almost outside life. All this which I have told you is something told to you before, many times, and it will be again."

Nonetheless, the Three went through all the rituals of thanksgiving, performing them with flawless grace and care—the color-and-sound demonstrations, the dances, the offerings of their own energy and all the rest. And Pur said, "It is possible to give thanks for a long-past act or even a mindless reflex, and we do so in the highest."

The Oldest pulsed dull red and did not answer, and after a time the Three took leave of him.

Armed with the knowledge he had given them, they had no trouble penetrating the barrier protecting Rock, the Oldest's personality-home, and in moments were once again alone with themselves in the raging storm which encircled the vortex. For long minutes they hung in midair, whirling and darting in their most tightly-linked patterns while the storm whipped them and the vortex pulled them. Then abruptly they broke their patterns and hurled themselves deliberately into the heart of the vortex itself. In a moment they had disappeared.

They seemed to feel neither motion nor lapse of time as they fell into the vortex. It was a change that came without perception or thought—a change from self to itself, from existence to void. They knew only that they had given themselves up to the vortex, that they were suddenly lost in darkness and a sense of surrounding emptiness which had no dimension. They knew without thinking that if they could have sent forth sound there would have been no echo, that a spark or even a bright flare would have brought no reflection from anywhere. For this was the place of the origin of life, and it was empty. It was up to them to fill it, if it was to be filled.

So they used the secret which the Oldest had given them, the secret which those at the Beginning had discovered by accident and which only one of the Oldest could have remembered. Having set themselves for this before entering the vortex, they played their individual parts automatically—the selfless, uncon-

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article/James Sutherland

# THE TRUCK THAT FLIES

Aside from the celebrated balloon flight, the one incident from Jules Verne's *Around the World in 80 Days* everyone remembers is the crazy trans-Atlantic crossing episode. In it, the adventurer Phileas Fogg, together with his lady friend and his little French valet, is racing from New York to Liverpool on a chartered steamship. Complications ensue when, in mid-ocean, the coal supply runs out.

Frantic to reach England and collect on his bet, Fogg orders the vessel's wooden fittings stripped and tossed into the boiler. Decking, ladders, cabin walls, railings and masts go first, then the lifeboats and rafts. Then all the ship's rope and papers—anything that will burn. "There was a perfect rage for demolition," Verne wrote.

When the ship finally arrives, nothing remains but the iron hull, the engines and the weary crew and passengers.

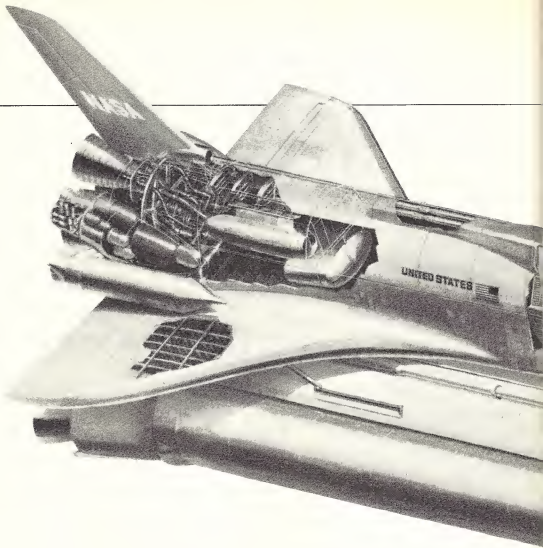
Fogg went on to win his wager, and the novel made Verne a millionaire several times over, while a century of technology has gradually altered it from a picture of contemporary reality to a charming nostalgia piece. Today's jumbo jetliners routinely carry a hundred times as many paying passengers in comfort at a velocity a hundred times greater than the old *S.S. Henrietta* could manage with full steam up and Phileas Fogg praying for an east wind.

But the single maniacal image of the steamship being systematically demolished, piece by piece, as it travels along is not as antique a vision as some people think. Quite the opposite. It might be taken as the symbol of the current state of affairs in that most advanced form of transportation, space travel.

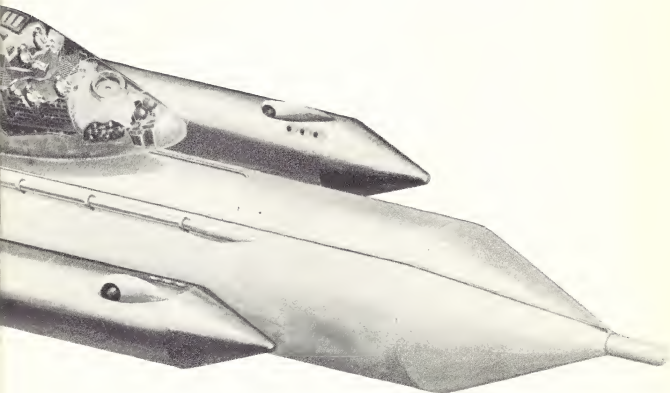
When Apollo 16 lifted off from the launch pad at Cape Kennedy,

astronauts Young, Duke and Mattingly rode a vehicle 363 feet tall weighing over 3,000 tons. Eleven days later, on April 27, 1972, Apollo 16 splashed down in the Pacific. All that remained was the scorched metal hull of the Command Module, standing twelve feet high and weighing five tons, and three exhausted passengers. Bits and pieces of that enormous machine had been strewn, according to a precise schedule, from the bottom of the Atlantic to the lunar hills and back again.

It cost over 210,000,000 dollars. Just to heft the moon lander and the Command Module with its life-support gear into orbit around the Earth was priced at a thousand dollars a pound, and involved the expenditure of the first two huge stages of the Saturn V rocket. From Earth orbit to the moon cost hundreds more, but the brunt of the work and the majority of fuel, tanks and engines was







spent simply to get above the atmosphere.

The economics of the present day level of space technology, as reflected in the Apollo program, have encountered wider and more impassioned criticism since the moonshots began in 1969, as the awareness of the high price of space-faring began to reach the average taxpayer. Dr. H.E. Newell, an administrator of the National Aeronautics and Space Administration noted: "After a mere fifteen years of space activity, people have become blasé about the subject, and even the most difficult of accomplishments seem to be taken for granted, and extensive benefits in the fields of weather, environment, communications and resources tend to fade mentally into the background of the commonplace."

Or, as an out-of-work aerospace engineer said, "The days of wine and roses are over for good. Public infatuation

with space is gone. Everyone expects space travel to pay for itself, now." He shook his head ruefully and admitted: "that's a rough proposition when you consider that each time NASA orbits a satellite, the entire launch rocket gets thrown away."

As public opinion and, correspondingly, government appropriations grow less dependable, NASA is under intense pressure to develop an economically sound alternative to the one-shot system it uses now. And that, in turn, has forced the space agency to reconsider its basic goals for the next couple of decades.

**W**hat happens after the moon landings? Ambitious plans for a space station, a lunar colony and an expedition to Mars were formulated—then shelved, as either too expensive or too irrelevant to the condition of the world in the

Seventies. After months of internal debate, NASA officials announced, on March 15, 1972, the initiation of a major new program, one that would run through the next twenty years and serve to correct a fundamental misjudgment made at the dawn of the space age.

NASA had committed itself to construct and operate an orbital shuttle or space truck.

**W**hen its development is completed five years from now (if NASA's timetable is kept to) the shuttle will be ready to receive its crew of four prior to its first scheduled commercial flight to Earth orbit. To an observer at the Cape that day, the shuttle would appear to be the oddest-looking space vehicle ever rolled out. Possessing none of the needle-slimness of the earlier Vanguard, Titan and Saturn rockets, the shuttle seems like a collection of otherwise

## NASA plans call for the space shuttle to make 40 flights a year, and actually make a profit from the flights.

unrelated components assembled at random and perched atop its gigantic mobile launching pad. It is not especially awe-inspiring. Even the design engineers refer to the shuttle as "the stack," on account of its altogether ungainly appearance.

But the hunchback profile of the shuttle actually signals a radical turnaround in the traditional American space flight policy. For, unlike any of the previous manned or unmanned rocket boosters, the shuttle was built to be used over and over, rather than fired just once and discarded. With a cargo capacity of 32 tons per flight into Earth orbit, the shuttle will replace almost all of the expendable, or one-launch-only, vehicles NASA currently employs with a single reliable and reusable system.

At the core of the shuttle system is the winged orbiter. The size of a small commercial jetliner, the orbiter resembles a dart, with wings and tail and engines in the stern behind the cavernous center cargo bay. In the nose section is the pilot's cockpit which faces forward to thick panes of heat-resistant glass. All of the expensive electronic guidance instruments, the inflight radars and the computer, are located here too, as in a normal airliner.

Although the orbiter is powered by three huge liquid fuel rocket motors, its fuel supply is strictly limited to a small reserve supply. During launch it receives liquid hydrogen and liquid oxygen from a 187 foot long fuel tank mounted piggyback to the orbiter during the entire period of ascent and right into Earth orbit. Even though the three engines in the tail of the orbiter develop a million and a half pounds of thrust at liftoff, the shuttle would still be too underpowered to attain orbital velocity without the additional push from two solid fuel rockets strapped onto either side of the fuel tank under the orbiter's wings.

When the countdown reaches zero all five of the engines will be ignited virtually simultaneously, generating nearly two million pounds of thrust blasting down the exhaust funnel beneath the quivering pad. Without any hesitation "the stack" roars upward. Since the engines of the orbiter are not directed straight along the axis of the vehicle, but are offset so as to clear the tail of the hydrogen/oxygen fuel tank, the shuttle will ride an incandescent roostertail like the spray from a racing boat, rather than the usual fiery pillar, into the sky.

At 25 miles altitude the two solid-fuel motors burn out, having boosted the shuttle to over 5,000 miles per hour. An

ejection mechanism consisting of explosive separating bolts and small low-thrust rockets push the empty casings away from the fuel tank and the orbiter combination, which is still accelerating. Both the burnt-out motors curve upwards for several more miles, coasting until gravity and air resistance make them fall back. A few miles above the ocean parachutes open automatically and a radio homing beacon comes to life, alerting a nearby NASA recovery ship which retrieves the floating casings and ferries them to a factory where they are inspected and repaired and refueled for the next shuttle mission.

Meanwhile, the orbiter fulfills its name and sweeps into a near-circular path 100 miles or more above the Earth's surface, at a speed of 18,000 miles per hour. With a stable orbit achieved, the crew of the shuttle prepares for its week of work.

It is at this point in the flight that the true economic advantages of the shuttle should begin to be apparent. Thus far nothing has been purposely expended, except for the fuel. In a conventional missile-style launch just the opposite would be the case: at least the first two stages of the launch booster would be crumpled heaps of metal on the floor of the sea.

A further advantage of the shuttle lies in the simple fact that there are, besides the two pilots, two flight engineers aboard the orbiter who can watch over the cargo of satellites and give them thorough checkings before actually opening up the twin doors of the cargo bay and sending them off into independent orbits. Any satellite that was found not to be working correctly could be repaired on the spot, right in the cargo bay itself, or be returned to Earth and fixed there, then returned to orbit aboard another shuttle flight. In current practice, if the satellite in orbit conks out, it stays dead, and another satellite must be built and sent up with another one-shot booster rocket.

Just as the nightmare of persons involved with satellites is that a fifty-cent electronic component will shut it down after all that time, effort and money to get it orbited, the recurring fear of the launch crews is that something similar will occur to the complex booster rockets. One recent satellite program had the ill luck to be cursed with both of these mishaps; it was particularly abusive because the satellites were by far the most expensive automated probes ever created by NASA, the Orbiting

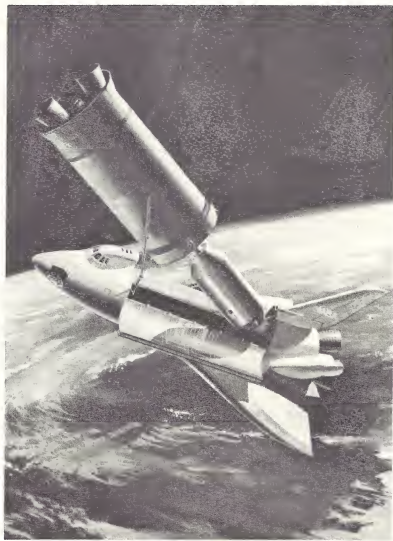
Astronomical Observatories (OAO) series. The first was designed to explore a variety of stellar phenomena that Earthbound observers were prevented from seeing by the smoggy curtain of the atmosphere. It cost "enough to build a half dozen Mount Palomar telescopes," and was ruined by the failure of a battery recharger after the satellite went into a perfect orbit. OAO III's electronics worked to perfection, but it never had the chance to observe much because the protective shroud cover remained locked around the satellite.

A quick run-through by a flight engineer in the shuttle would have revealed the trouble with OAO I, and repairs would have been relatively simple. In the second case, a failure of the booster, a flight engineer could quickly loosen such a shroud in the cargo bay with a screwdriver.

The shuttle is considerably more than an orbital repair truck, no matter how valuable it might be in that capacity alone. The designers have foreseen several other concurrent roles.

First and foremost is observation of the Earth itself, with a special emphasis on the state of the environment. Because of the heavy payload capacity, the shuttle could remain in month-long orbital missions with teams of ecologists and meteorologists to monitor changes in the environment using large, sophisticated instrumentation, such as infrared photographic equipment which can detect minute changes in temperature over wide areas. The seas and oceans would go under special scrutiny to learn how the action of deep-sea currents effect the weather and so the plant and animal life on every continent. Additionally, for the first time, truly large and sensitive measuring devices could be brought to bear on the sun, to discover whether the action of solar flares influences atmospheric conditions on Earth, and if, as some suspect, a link exists between them and the half-understood delicate biological rhythms that seem to govern the life process on a cellular level.

Another area of investigation to be performed inside the shuttle of equal interest to diverse groups is the possibility of finding totally new manufacturing techniques in the weightless, airless environment of space. Already there are indications that completely revolutionary discoveries in metallurgy, biochemistry and electronics await researchers in space. The shuttle could provide a base for medical research into the effect of weightlessness on cancer



The space shuttle, shown with the cargo bay open, will be able to deliver up to 65,000 pounds of varied payload into orbit in its 15 by 60 foot cargo bay. These drawings show the payload (a satellite) being pulled away from the cargo bay by a command-controlled space tug for precise orbital placement. The shuttle will be developed by the North American Rockwell Space Division under a six-year, estimated \$2.6 billion contract.

cells, on the causes of muscular deterioration in heart and other diseases, and on the rate and process of aging.

One of the most pressing problems on Earth is the consistent inability of physicists to achieve hydrogen fusion power in a controlled form. The reason for the elusive nature of this goal has given rise to speculation that the key lies off the Earth. Nobel Prize winner for Physics, Hannes Alfvén, proposed that the study of magnetic fields and the properties of charged particles in space, by scientists working directly in space, would ultimately reveal the basic techniques needed to control fusion power.

Alfvén was careful to stress the need for the kind of *manned* space operations that the shuttle likely would be able to provide in the future, as against the limited capabilities of robot space probes and satellites. Even though his research

was in one of the most abstract branches of science, Alfvén's attitude was that men should go and explore and research, and then return to Earth to evaluate their findings with the opportunity to return for additional data when the need arose. The space shuttle system appears to embody the desire of Alfvén and others for capitalizing on the unique conditions that interplanetary space seems to offer to the theoretical as well as the applied scientists.

**W**hen the mission has come to its end, whether it be routine repair work on satellites, an ecological survey or an investigation into the Earth's magnetic fields, the crew of the shuttle start their preparations for the somewhat tricky process of reentry. The large, empty fuel tank is uncoupled from the orbiter first.

Since the tank is the only non-recoverable item in the space shuttle system, it has been designed to be as inexpensive a loss as possible. It is little more than a cigar-shaped shell made of a thin alloy with a bulkhead in the center to separate the two fuel compartments, and contains none of the costly electronics, pumps or engines, all of which are concentrated in the orbiter. Tiny braking rockets nudge it into the atmosphere where it is burned to dust by the heat of descent.

Likewise, the orbiter's crew fires its retrorockets and steers it into the atmosphere. A new kind of heat shield protects the lower hull of the orbiter from the fierce reentry: instead of a single convex heat shield, the bottom surfaces of the orbiter are covered with thousands of closely-fitted ceramic tiles that slowly

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# PATHHS

Evolution never stops—at least not for a successful species. But what happens when evolution—altered by artificial environment—destroys the very viability of the species?

The reefs and domes of City South gleamed beneath the stars. It was late night; little traffic disturbed the waterways. On the top level of the *Harbinger-Communicator's* dome, a single office was occupied. Soft ultraviolet spilled out through the wall apertures.

"Just who the hell are you, really?" Morisel sank back in the warm fluid. His visitor stood and lumbered to the edge of the newsman's meditation pool.

"Think of me as a distant relative." The words grated across the edges of his serrated beak. "A good many generations removed."

"Look," said Morisel. "I don't want to seem cynical. You may be my ten-times-removed egg-father or something, but right now it's awfully hard not to believe you're just a run-of-the-mill aberrant. I mean, here you crawl into my office close to midnight, spread yourself down, and then calmly announce you're a traveler from the future. That takes either incredible gall, or . . ."

"I spoke truth," said Morisel's visitor. He towered over the reclining newsman. The writhing cilia around his beak settled in no specific emotion; sincerity flashed briefly, before collapsing back to chaos.

"Don't try to intimidate me," Morisel snapped. The self-proclaimed time traveler moved back. The newsman tried to assume conciliatory signals. There might be a feature-story here, he speculated. *What the hell, the silly season may as well start early.*

"Some sort of alien being from another planet, I might accept," said Morisel. "If he had suitable proof. It's unlikely, but scientifically possible. Now time travel? No. That's out."

"Your skepticism is laudable," replied the man. He settled himself on his lower coil of tentacles. "I suppose logic is one of the attributes that has made you so successful in your profession. But don't let it trap you in blind dogmatism."

"All right," said Morisel. "Well, I'm

doing my best to be understanding." He played abstractedly with a stylus. "Then supposing you *are* from the future, what are you doing back here?"

The visitor's voice reverberated hollowly. "I have returned many millenia to warn you. I realize that sounds rather melodramatic, but it is essentially the substance of my mission."

"Oh?" Morisel glanced at his chronometer and suppressed an expression of annoyance. "Warn me of what?" He roughly sketched a cartilaginous skull on the gell pad beside his electric scriptor.

The traveler folded a row of extensipods, the limbs angling stiffly. "I did not come back to warn specifically you. Rather I am, or at least I have been, trying to alert your entire world."

"What do you mean, 'have been trying'?" Morisel asked. "You tried to contact others?"

"Thus far, only one." The man's cilia settled grimly. "A fellow in the communications field, one of your acquaintances, I believe. His name was Connot."

"Des Connot?" Morisel, startled, looked up. "The office said he left the *Sentinel* for extended recreation. I wondered. . . ."

"Connot is confined."

"Des?"

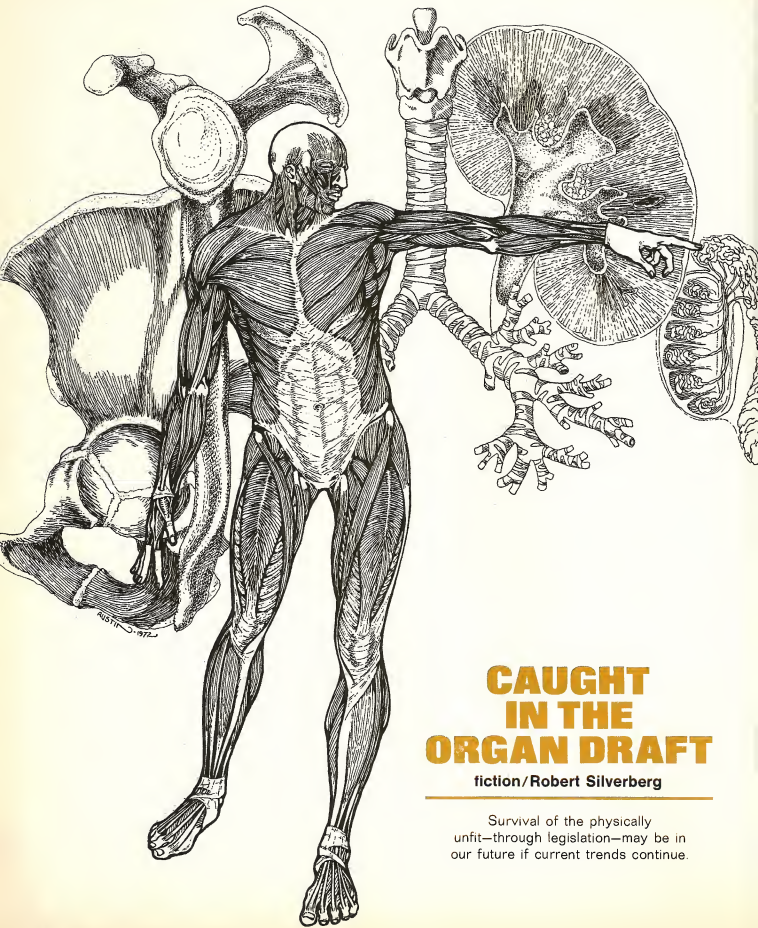
"His price for believing my story."

Slightly shaken, the newsman erased the skull on his gell pad and drew a pattern of interlocking circles. "All right, just because Connot turned aberrant doesn't mean anything. I can't believe a good reporter like Des would come apart just because of a ghost story or something." He paused, expecting his words to draw the man across the pool into a response. The bait failed; the man only stared silently back at Morisel.

"Go ahead and tell it," Morisel said

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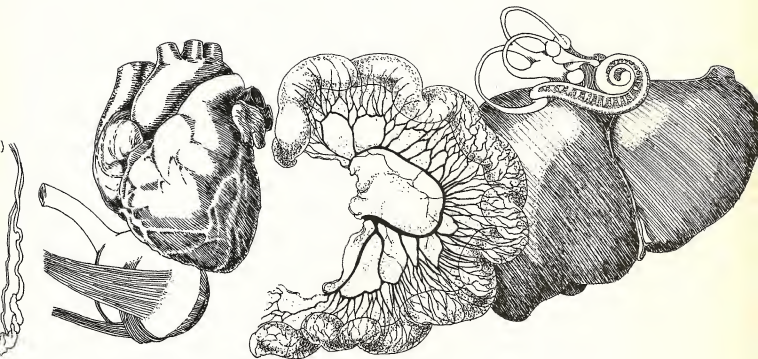




## CAUGHT IN THE ORGAN DRAFT

fiction/Robert Silverberg

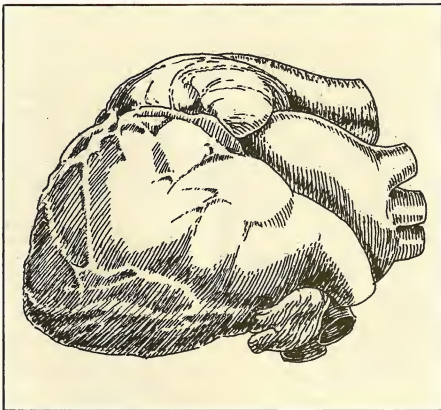
Survival of the physically unfit—through legislation—may be in our future if current trends continue.



When a young man is faced with the choices of giving up part of his body, his freedom, or his country, some moral confusion is inevitable.

Look there, Kate, down by the promenade. Two splendid seniors walking side by side near the water's edge. They radiate power, authority, wealth, assurance. He's a judge, a senator, a corporation president, no doubt, and she's—what?—a professor emeritus of international law, let's say. There they go toward the plaza, moving serenely, smiling, nodding graciously to passersby. How the sunlight gleams in their white hair! I can barely stand the brilliance of that reflected aura: it blinds me, it stings my eyes. What are they, eighty, ninety, a hundred years old? At this distance they seem much younger—they hold themselves upright, their backs are straight, they might pass for being only fifty or sixty. But I can tell. Their confidence, their poise, mark them for what they are. And when they were nearer I could see their withered cheeks, their sunken eyes. No cosmetics can hide that. These two are old enough to be our great-grandparents. They were well past sixty before we were even born, Kate. How superbly their bodies function! But why not? We can guess at their medical histories. She's had at least three hearts, he's working on his fourth set of lungs, they apply for new kidneys every five years, their brittle bones are reinforced with hundreds of skeletal snips from the arms and legs of hapless younger folk, their dimming sensory apparatus is aided by countless nerve-grafts obtained the same way, their ancient arteries are freshly sheathed with sleek teflon. Ambulatory assemblages of second-hand human parts, spiced here and there with synthetic or mechanical organ-substitutes, that's all they are. And what am I, then, or you? Nineteen years old and vulnerable. In their eyes I'm nothing but a ready stockpile of healthy organs, waiting to serve their needs. Come here, son. What a fine strapping young man you are! Can you spare a kidney for me? A lung? A choice little segment of intestine? Ten centimeters of your ulnar nerve? I need a few pieces of you, lad. You won't deny a distinguished elder leader like me what I ask, will you? Will you?

Today my draft notice, a small crisp document, very official-looking, came shooting out of the data slot when I punched for my morning mail. I've been expecting it all spring: no surprise, no shock, actually rather an anticlimax now that it's finally here. In six weeks I am to report to Transplant House for



my final physical exam—only a formality, they wouldn't have drafted me if I didn't already rate top marks as organ-reservoir potential—and then I go on call. The average call time is about two months. By autumn they'll be carving me up. Eat, drink, and be merry, for soon comes the surgeon to my door.

A straggly band of senior citizens is picketing the central headquarters of the League for Bodily Sanctity. It's a counter-demonstration, an anti-anti-transplant protest, the worst kind of political statement, feeding on the ugliest of negative emotions. The demonstrators carry glowing signs that say:

**BODILY SANCTITY—OR  
BODILY SELFISHNESS?**

And:

**YOU OWE YOUR  
LEADERS YOUR  
VERY LIVES**

And:

**LISTEN TO THE VOICE  
OF EXPERIENCE**

The picketers are mid-echelon seniors, barely across the qualifying line, the ones who can't really be sure of getting transplants. No wonder they're edgy

about the League. Some of them are in wheelchairs and some are encased right up to the eyebrows in portable life-support systems. They croak and shout bitter invective and shake their fists. Watching the show from an upper window of the League building, I shiver with fear and dismay. These people don't just want my kidneys or my lungs. They'd take my eyes, my liver, my pancreas, my heart, anything they might happen to need.

I talked it over with my father. He's forty-five years old—too old to have been personally affected by the organ draft, too young to have needed any transplants yet. That puts him in a neutral position, so to speak, except for one minor factor: his transplant status is 5-G. That's quite high on the eligibility list, not the top-priority class but close enough. If he fell ill tomorrow and the Transplant Board ruled that his life would be endangered if he didn't get a new heart or lung or kidney, he'd be given one practically immediately. Status like that simply has to influence his objectivity on the whole organ issue. Anyway, I told him I was planning to appeal and maybe even to resist. "Be reasonable," he said, "be rational, don't let your emo-

tions run away with you. Is it worth jeopardizing your whole future over a thing like this? After all, not everybody who's drafted loses vital organs."

"Show me the statistics," I said. "Show me."

He didn't know the statistics. It was his impression that only about a quarter or a fifth of the draftees actually got an organ call. That tells you how closely the older generation keeps in touch with the situation—and my father's an educated man, articulate, well-informed. Nobody over the age of thirty-five that I talked to could show me any statistics. So I showed them. Out of a League brochure, it's true, but based on certified National Institute of Health reports. Nobody escapes. They always clip you, once you qualify. The need for young organs inexorably expands to match the pool of available organpower. In the long run they'll get us all and chop us to bits. That's probably what they want, anyway. To rid themselves of the younger members of the species, always so troublesome, by cannibalizing us for spare parts, and recycling us, lung by lung, pancreas by pancreas, through their own deteriorating bodies.

*Fig. 4. On March 23, 1964, this dog's own liver was removed and replaced with the liver of a non-related mongrel donor. The animal was treated with azathioprine for 4 months and all therapy then stopped. He remains in perfect health 6-3/4 years after transplantation.*

**T**he war goes on. This is, I think, its fourteenth year. Of course they're beyond the business of killing now. They haven't had any field engagements since '93 or so, certainly none since the organ-draft legislation went into effect. The old ones can't afford to waste precious young bodies on the battlefield. So robots wage our territorial struggles for us, butting heads with a great metallic clank, laying land mines and twitching their sensors at the enemy's mines, digging tunnels beneath his screens, et cetera, et cetera. Plus, of course, the quasi-military activity—economic sanctions, third-power blockades, propaganda telecasts beamed as overrides from merciless orbital satellites, and stuff like that. It's a subtler war than the kind they used to wage: nobody dies. Still, it drains national resources. Taxes are going up again this year, the fifth or sixth year in a row, and they've just slapped a special Peace

Surcharge on all metal-containing goods, on account of the copper shortage. There once was a time when we could hope that our crazy old leaders would die off or at least retire for reasons of health, stumbling away to their country villas with ulcers or shingles or scabies or scruples and allowing new young peacemakers to take office. But now they just go on and on, and immortal and insane, our senators, our cabinet members, our generals, our planners. And their war goes on and on too, their absurd, incomprehensible, diabolical, self-gratifying war.

**I** know people my age or a little older who have taken asylum in Belgium or Sweden or Paraguay or one of the other countries where Bodily Sanctity laws have been passed. There are about twenty such countries, half of them the most progressive nations in the world and half of them the most reactionary. But what's the sense of running away? I don't want to live in exile. I'll stay here and fight.

**N**aturally they don't ask a draftee to give up his heart or his liver or some other organ essential to life, say his medulla oblongata. We haven't yet reached that stage of political enlightenment at which the government feels capable of legislating fatal conscription. Kidneys and lungs, the paired organs, the dispensable organs, are the chief targets so far. But if you study the history of conscription over the ages you see that it can always be projected on a curve rising from rational necessity to absolute lunacy. Give them a fingertip, they'll take an arm. Give them an inch of bowel, they'll take your guts. In another fifty years they'll be drafting hearts and stomachs and maybe even brains, mark my words; let them get the technology of brain transplants together and nobody's skull will be safe. It'll be human sacrifice all over again. The only difference between us and the Aztecs is one of method; we have anesthesia, we have antiseptics and asepsis, we use scalpels instead of obsidian blades to cut out the hearts of our victims.

#### MEANS OF OVERCOMING THE HOMOGRAFT REACTION

*The pathway that has led from the demonstration of the immunological nature*

*of the homograft reaction and its universality to the development of relatively effective but by no means completely satisfactory means of overcoming it for therapeutic purposes is an interesting one that can only be touched upon very briefly. The year 1950 ushered in a new era in transplantation immunobiology in which the discovery of various means of weakening or abrogating a host's response to a homograft—such as sublethal whole body x-irradiation, or treatment with certain adrenal corti-costeroid hormones, notably cortisone—began to influence the direction of the mainstream of research and engender confidence that a workable clinical solution might not be too far off. By the end of the decade powerful immuno-suppressive drugs, such as 6-mercaptopurine, had been shown to be capable of holding in abeyance the reactivity of dogs to renal homografts, and soon afterwards this principle was successfully extended to man.*

**I**s my resistance to the draft based on an ingrained abstract distaste for tyranny in all forms or rather on the mere desire to keep my body intact? Could it be both, maybe? Do I need an idealistic rationalization at all? Don't I have an inalienable right to go through my life wearing my own native-born kidneys?

**T**he law was put through by an administration of old men. You can be sure that all laws affecting the welfare of the young are the work of doddering moribund ancients afflicted with angina pectoris, atherosclerosis, prolapses of the infundibulum, fulminating ventricles, and dilated viaducts. The problem was this: not enough healthy young people were dying of highway accidents, successful suicide attempts, diving-board miscalculations, electrocutions, and football injuries; therefore there was a shortage of transplantable organs. An effort to restore the death penalty for the sake of creating a steady supply of state-controlled cadavers lost out in the courts. Volunteer programs of organ donation weren't working out too well, since most of the the volunteers were criminals who signed up in order to gain early release from prison: a lung reduced your sentence by five years, a kidney got you three years off, and so on. The exodus of convicts from the jails under this clause wasn't so popular among

suburban voters. Meanwhile there was an urgent and mounting need for organs; a lot of important seniors might in fact die if something didn't get done fast. So a coalition of senators from all four parties rammed the organ-draft measure through the upper chamber in the face of a filibuster threat from a few youth-oriented members. It had a much easier time in the House of Representatives, since nobody in the House ever pays much attention to the text of a bill up for a vote, and word had been circulated on this one that if it passed, everybody over 65 who had any political pull at all could count on living twenty or thirty extra years, which to a representative means a crack at ten to fifteen extra terms of office. Naturally there have been court challenges, but what's the use? The average age of the eleven justices of the Supreme Court is 78. They're human and mortal. They need our flesh. If they throw out the organ draft now, they're signing their own death warrants.

**F**or a year and a half I was the chairman of the anti-draft campaign on our campus. We were the sixth or seventh local chapter of the League for Bodily Sanctity to be organized in this country, and we were real activists. Mainly we would march up and down in front of the draft board offices carrying signs proclaiming things like:

#### KIDNEY POWER

And: A MAN'S BODY IS HIS CASTLE

And: THE POWER TO CONSCRIPT ORGANS IS THE POWER TO DESTROY LIVES

We never went in for the rough stuff, though, like bombing organ-transplant centers or hijacking refrigeration trucks. Peaceful agitation, that was our motto. When a couple of our members tried to swing us to a more violent policy, I delivered an extemporaneous two-hour speech arguing for moderation. Naturally, I was drafted the moment I became eligible.

**I** can understand your hostility to the draft," my college adviser said. "It's certainly normal to feel queasy

about surrendering important organs of your body. But you ought to consider the countervailing advantages. Once you've given an organ you get a 6-A classification, Preferred Recipient, and you remain forever on the 6-A roster. Surely you realize that this means that if you ever need a transplant yourself, you'll automatically be eligible for one, even if your other personal and professional qualifications don't lift you to the optimum level. Suppose your career plans don't work out and you become a manual laborer, for instance. Ordinarily you wouldn't rate even a first look if you developed heart disease, but your Preferred Recipient status would save you. You'd get a new lease on life, my boy."

I pointed out the fallacy inherent in this. Which is that as the number of draftees increases, it will come to encompass a majority or even a totality of the population, and eventually everybody will have 6-A Preferred Recipient status by virtue of having donated, and the term Preferred Recipient will cease to have any meaning. A shortage of transplantable organs would eventually develop as each past donor stakes his claim to a transplant when his health fails, and in time they'd have to arrange the Preferred Recipients by order of personal and professional achievement anyway, for the sake of arriving at some kind of priorities within the 6-A class, and we'd be right back where we are now.

*Fig. 7. The course of a patient who received antilymphocyte globulin (ALG) before and for the first 4 months after renal homotransplantation. The donor was an older brother. There was no early rejection. Prednisone therapy was started 40 days postoperatively. Note the insidious onset of late rejection after cessation of globulin therapy. This was treated by a moderate increase in the maintenance doses of steroids. This delayed complication occurred in only 2 of the first 20 recipients of intrafamilial homografts who were treated with ALG. It has been seen with about the same low frequency in subsequent cases. (By permission of Surg. Gynec. Obstet. 126 (1968): p. 1023.)*

**S**o I went down to Transplant House today, right on schedule, to take my physical. A couple of my friends thought I was making a tactical mistake by reporting at all; if you're going to resist, they said, resist at every point along the

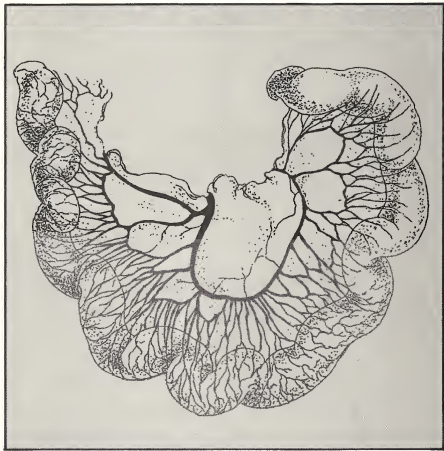
line. Make them drag you in for the physical. In purely idealistic (and ideological) terms, I suppose they're right. But there's no need yet for me to start kicking up a fuss. Wait till they actually say, "We need your kidney, young man." Then I can resist, if resistance is the course I ultimately choose. (Why am I wavering? Am I not entirely convinced of the injustice of the entire organ-draft system? I don't know. I'm not even sure that I am wavering. Reporting for your physical isn't really a sellout to the system.) I went, anyway. They tapped this and x-rayed that and peered into the other thing. Yawn, please. Bend over, please. Cough, please. Hold out your left arm, please. They marched me in front of a battery of diagnostic machines and I stood there hoping for the red light to flash—*tilt*, get out of here!—but I was, as expected, in perfect physical shape, and I qualified for call. Afterward, I met Kate and we walked in the park and held hands and watched the glories of the sunset and discussed what I'll do, when and if the call comes. *If?* Wishful thinking, boy!

**I**f your number is called you become exempt from military service, and they credit you with a special \$750 tax deduction every year. Big deal.

**A**nother thing they're very proud of is the program of voluntary donation of unpaired organs. This has nothing to do with the draft, which—this far, at least—requisitions only paired organs, organs that can be spared without loss of life. For the last twelve years it's been possible to walk into any hospital in the United States and sign a simple release form allowing the surgeons to slice you up. Eyes lungs heart intestines pancreas liver anything, you give it all to them. This process used to be known as suicide in a simpler era and it was socially disapproved, especially in times of labor shortages. Now we have a labor surplus, because even though our population growth has been fairly slow since the middle of the century, the growth of labor-eliminating mechanical devices and processes has been quite rapid, even exponential. Therefore to volunteer for this kind of total donation is considered a deed of the highest social utility, removing as it does a healthy young body from the overcrowded labor force and at the same time providing some elder



**Demanding that a man serve his country is an American tradition. But what price traditions when a Purple Heart is guaranteed?**



statesman with the assurance that the supply of vital organs will not unduly diminish. Of course you have to be crazy to volunteer, but there's never been any shortage of lunatics in our society.

**I**f you're not drafted by the age of 21, through some lucky fluke, you're safe. And a few of us do slip through the net, I'm told. So far there are more of us in the total draft pool than there are patients in need of transplants. But the ratios are changing rapidly. The draft legislation is still relatively new. Before long they'll have drained the pool of eligible draftees, and then what? Birth rates nowadays are low; the supply of potential draftees is finite. But death rates are even lower; the demand for organs is essentially infinite. I can give you only one of my kidneys, if I am to survive; but you, as you live on and on, may require more than one kidney transplant. Some recipients may need five or six sets of kidneys or lungs before they finally get beyond hope of repair at age one-seventy or so. As those who've given organs come to requisition organs

later on in life, the pressure on the under-21 group will get even greater. Those in need of transplants will come to outnumber those who can donate organs, and everybody in the pool will get clipped. And then? Well, they could lower the draft age to 17 or 16 or even 14. But even that's only a short-term solution. Sooner or later, there won't be enough spare organs to go around.

**W**ill I stay? Will I flee? Will I go to court? Time's running out. My call is sure to come up in another few weeks. I feel a tickling sensation in my back, now and then, as though somebody's quietly sawing at my kidneys.

**C**annibalism. At Chou-kou-tien, Dragon Bone Hill, 25 miles southwest of Peking, paleontologists excavating a cave early in the twentieth century discovered the fossil skulls of Peking Man, *Pithacanthropus pekinensis*. The skulls had been broken away at the base, which led Franz Weidenreich, the direc-

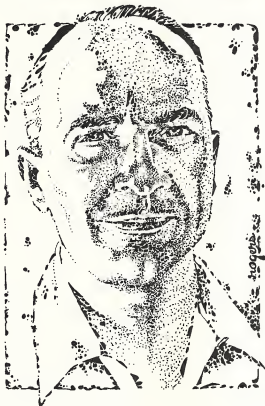
tor of the Dragon Bone Hill digs, to speculate that Peking Man was a cannibal who had killed his own kind, extracted the brains of his victims through openings in the base of their skulls, cooked and feasted on the cerebral meat—there were hearths and fragments of charcoal at the site—and left the skulls behind in the cave as trophies. To eat your enemy's flesh: to absorb his skills, his strengths, his knowledge, his achievements, his virtues. It took mankind five hundred thousand years to struggle upward from cannibalism. But we never lost the old craving, did we? There's still easy comfort to gain by devouring those who are younger, stronger, more agile than you. We've improved the techniques, is all. And so now they eat us raw, the old ones, they gobble us up, organ by throbbing organ. Is that really an improvement? At least Peking Man cooked his meat.

**O**ur brave new society, where all share equally in the triumphs of medicine, and the deserving senior citizens need not feel that their merits and prestige will be rewarded only by a cold grave—we sing its praises all the time. How pleased everyone is about the organ draft: except, of course, a few disgruntled draftees.

**T**he ticklish question of priorities. Who gets the stockpiled organs? They have an elaborate system by which hierarchies are defined. Supposedly a big computer drew it up, thus assuring absolute godlike impartiality. You earn salvation through good works: accomplishments in career and benevolence in daily life win you points that nudge you up the ladder until you reach one of the high-priority classifications, 4-G or better. No doubt the classification system is impartial and is administered justly. But is it rational? Whose needs does it serve? In 1943, during World War II, there was a shortage of the newly discovered drug penicillin among the American military forces in North Africa. Two groups of soldiers were most in need of its benefits: those who were suffering from infected battle wounds and those who had contracted venereal disease. A junior medical officer, working from self-evident moral principles, ruled that the wounded heroes were more deserving of treatment than the self-indulgent

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# HEINLEIN ON SCIENCE FICTION



ROBERT HEINLEIN

**V**ERTEX is grateful to Forrest J. Ackerman—Mr. Science Fiction—for the resurrection of the following feature: "Discovery of the Future," being the Guest of Honor speech by Robert Heinlein delivered at the Third World Science Fiction Convention in Denver on Independence Day, 1941. As you read the transcript of his speech keep that date in mind. 1941! The war he is talking about is World War Two, not Vietnam. The society he is talking about is that of the Thirties, not the Seventies. The science he is talking about is pre-atomic bomb, pre-V-2 rocket, pre-just about everything we take for granted today. He gave that speech in an era when the "common man" still, at least unconsciously, equated science and magic. Is it any wonder then that the far-ranging young intellect of 1941, a writer who had just completed his first book, was to become the man who is generally recognized as the "Dean of Science Fiction Writers," one of the few men who have made science fiction "legitimate" literature?

We are beholden to Walter J. Daugherty because, 32 years ago, before tape recorders or even wire recorders, he recorded Heinlein's speech on primitive 78 r.p.m. acetate records; and also beholden to the number one fan of the day, a young

Forrest J. Ackerman, for having the foresight to laboriously transcribe and stencil the speech. The mimeographed edition of that time was a mere 200 copies; an additional 100 were printed later. It is doubtful if more than a handful of either edition remains today in scattered collections, and the original 10¢ publication would no doubt command several hundred times its original price as a collector's item now. So VERTEX feels it is rendering a valuable service to its readers in bringing this landmark speech back into print after a lapse of more than three decades—and we thank Mr. Ackerman for making this event possible.

Forrest Ackerman has asked us to quote him: "As is common knowledge, I hold the world record for attendance at World Science Fiction Conventions, having missed only one in my life: 1951, when my father died. Having heard every Guest of Honor's speech, including Van Vogt's, three by Campbell, Theodore Sturgeon's, Hugo Gernsback's, Phillip José Farmer's, et al, I still consider Heinlein's 1941 speech the most powerful, prophetic, stirring, significant, educative and entertaining—the best of them all. The second best: the Seattle 1961 speech by—Robert A. Heinlein."

Assignment In Eternity \* Door Into Summer \* Podkayne of Mars \* Between Planets \* Beyond This Horizon \* Citizen Of The Galaxy \* Farmer In The Sky \* Universe \* Waldo & Magic, Inc. \* Red Planet \* Glory Road \* Have Space Suit—Will Travel \* Farnham's Freehold \* Space Cadet \* I Will Fear No Evil \* Stranger In A Strange Land \* Menace From Earth \* Tunnel In The Sky \* Orphans Of The Sky \* Methuselah's Children \* Star Beast \* Time For The Stars \* The Unpleasant Profession Of Jonathan Hoag \* Starship Troopers \* Puppet Masters \* Revolt In 2100 \* The Moon Is A Harsh Mistress \* Rocket Ship Galileo \* Sixth Column \* The Man Who Sold The Moon \* The Green Hills Of Earth \* Rolling Stones \* Starman Jones \* Tomorrow The Stars \*

## THE DISCOVERY OF THE FUTURE

(Ackerman concludes introduction of Guest Speaker, comparing him with the author of "Odd John," "Last and First Men," "Star Maker," naming him "the American W. Olaf Stapledon.") Heinlein speech starts:

**T**hank you, Forry, Mr. Chairman . . . I have here in my hand the manuscript of a speech. If it works out anything like synopses I have used, this speech will still be left when I get through.

To get to the matter of the talk itself: THE DISCOVERY OF THE FUTURE, Olon (Wiggins, *Convention Directory*) told me there was no time limit on me, so I assumed that he wanted my usual three hour speech. Or perhaps we can just keep going here until the hall is cleared.

Anyhow, Forry told you that I had been reading science fiction for a long time. I have. I have been reading science fiction as long as I could get hold of it; and I probably experienced much the same process that most of you did: parental disapproval, those funny looks you get from friends, etc., for reading "that kind of junk." Well, we here, the science fiction fans—we are the lunatic fringe! We are the crazy fools who read that kind of stuff, who read those magazines with the covers with the outlandish machines and the outlandish animals on it, etc. You leave one around loose in your home. Your friends will pick it up, those who are not fans, ask you if you *really* read that stuff, and from then on they look at you with suspicion. Apparently we're not quite right in the head.

Why do we do it? I think I know. This is an opinion, but I think I know what it amounts to, why it is that we like science fiction primarily. It is not just for the adventure of the story itself—that sort of thing you can find in other types of fiction. But to my mind it is because science fiction has in it, as its strongest factor, the single thing that separates the human race from all other animals. In that I refer to a quality that has been termed "time-binding." It is a term that may not have come to your attention, I know it has to some of you. It is a technical term invented by Alfred Korzybski and it refers to the fact that the human animal lives not only in the present, but in the past and in the future.

In connection with the statement that the human animal differs from all other

animals *only* in this one respect, I realize that reading and writing are things that other animals do not do, but reading and writing are aspects of time-binding. The definition includes reading and writing. That is the primary technique whereby we are able to make records, to gather data and to look into the future. The other things that we do that we think of as making us humans rather than animals, most animals—I should not say that—some animals at some time have done. They form governments. They invent machines. Some animals even use money. I have not seen one doing it, but I have heard reports that I believe to be credible. But time-bind they do not, to anything like the extent that the human race does.

The operation of time-binding consists of making use of the multitudinous records that we have of the past and on the basis of those records, on the basis of the data that we have collected directly and the data that we get from others by means of our time-binding techniques, including reading and writing, sound movies . . . by means of those techniques, figuring out something about the way the universe looks and making predictions on which we can plan our future conduct. And it means that we have lived mentally in the past and in the future as well as in the present. And that is certainly true of science fiction fans.

I like the term Future Fiction that Charlie Hornig gave to it. It seems to me a little bit broader than Science Fiction because most of these stories are concerned with the future, what *may* happen.

In taking the future into account, trying to predict what it will be, and trying to make your plans accordingly, you are time-binding. The child-like person lives from day to day. The adult tries to plan for a year or two, at least. Statesmen try to plan for, oh, maybe twenty years or something like that. There are a few institutions, longer than the lives of men, as, for example, the Smithsonian Institution and the Catholic Church, to give a spread to the examples, who think not in terms of lifetimes, but in centuries. They make their plans that far ahead, and to some extent make them work out.

Science fiction fans differ from most of the rest of the race by thinking in terms of racial magnitudes—not even centuries but thousands of years. The Stapledon to whom I was flatteringly compared by Forry thinks in terms of . . . how many years? How far does his time scale go? I don't know; the figures

mean nothing to me. That is what science fiction consists of: Trying to figure out from the past and from the present what the future may be. And in that we are behaving like human beings.

Now, all human beings time-bind to some extent when they try to discover the future. But most human beings—and those who laugh at us for reading science fiction—time-bind, make their plans, make their predictions, only within the limits of their immediate personal affairs. In those respects they may try to predict for a year or two, make plans, even try to predict for their entire lifetimes; but they rarely try to predict in terms of the culture in which they live. In fact, most people, as compared with science fiction fans, have no conception whatsoever of the fact that the culture they live in *does* change; that it *can* change. Even though they may believe it with the top of their minds, they don't believe it 'way back in the thalamus, back in their emotions. They don't really believe it.

Our grandfathers thought the horse could never be replaced by the auto. Four years after the Wright brothers first flew, they were still trying to get the War Department just to come out and take a look at the thing. And when one major general did take a look at an aeroplane flying, he remarked that it was a very interesting scientific toy but of course it had no possible practical military application! And that was just a short time ago—a very short time ago.

That is still happening. You will hear that sort of thing around you all the time. I made use awhile ago of a quotation which I would like to use again in that connection, from G.B. Shaw. Referring to Britannicus in "Caesar and Cleopatra," he said something to the effect that "he is an outlander and a barbarian and he believes that the customs of his tribe are the laws of nature." And that is the sort of thing that you run up against when you try to get most people to read science fiction. And that is why they think you are crazy, because they believe that the customs of their tribe are the laws of nature, immutable and unchangeable. They do not believe in change. Phrases like "There'll always be an England." It's a pleasant phrase and an inspiring one at the present time; but we know better. There won't always be an England—nor a Germany, nor a United States, nor a Baptist Church, nor monogamy, nor the Democratic Party, nor the modesty tabu, nor the superiority of the white race, nor aeroplanes—they will go—nor automobiles—they'll be gone,



**Robert Heinlein is one of the most prolific of science fiction writers, and amazing numbers of his predictions have already come to pass.**

we'll see them go. Any custom, technique, institution, belief, or social structure that we see around us today will change, will pass, and most of them we will see change and pass.

In science fiction we try to envision what those changes might be. Our guesses are usually wrong, they are almost certain to be wrong. Some men with a greater grasp on data than others can do remarkably well at it. H. G. Wells, who knows probably of the data that makes up the world, oh, on the order of 10 times as much or perhaps higher than that than most science fiction writers or the best of the science fiction writers, has been remarkably successful in some of his predictions. Most of us—we aren't that lucky. I do not expect my so-called *History of the Future* to come to pass, not in anything like those terms. I think some of the trends in it may show up; but I do not think that my factual predictions as such are going to come to pass, even in their broad outlines.

*(Somebody put a glass of water around here, I've got to find it now, I'm drying up. Do you suppose it could be the altitude, Olen?)*

**N**ow, where were we?—You speak of this sort of thing to an ordinary man, tell him things are going to change; he will admit it—oh, yes, he will admit it—but he does not believe it; he does not believe it at all; it is just with the top of his mind. He believes in “progress”—quotation marks on that; he believes in “progress.” He thinks things will get a little bit bigger, and louder, and brighter, and a few more neon signs. That's standard, that's orthodox doctrine; he believes in that. *But he does not believe that any actual change in the basic nature of the culture in which he lives or its technology will take place.* Oh no! Aeroplanes he thinks are all right;

but those . . . er . . . those crazy rocket ship things—! Why, a rocket ship couldn't possibly fly—it hasn't got anything to PUSH on. That is the way he feels about it. There will never be rocket ships. That is alright for Buck Rogers in the funny papers. But he does not believe that there could be rocket ships; nor does he believe that there will be things that will make rocketships look like primitive gadgets that even the wildest of the science fiction writers have not been able to guess or think about. Rocketships are about as far as I am willing to go because I have not got data enough to think about to make a reasonable guess about the other forms of transportation or gadgets that we may have. But this same man did not believe in aeroplanes in 1910!

I have spoken primarily of mechanical changes because they are much easier to show, to point to, than the more subtle sociological changes, cultural changes, changes in our customs, and things of that sort. Some of these can be pointed out. I would like to point out one of them right now. The word “syphilis” could not be used in public even as short a time as 15 years ago. Yet, as I used it here now I did not see any shock around the room; nobody minded it; even the Ladies Home Journal runs articles on it. We are getting a little more civilized in that respect than we were 20 years ago. Our grandfathers considered that word indecent, and they believed that the things that were decent and indecent were subject to absolute rules, that they were laws of nature; and the majority of the people around us now believe that their criteria of decency and indecency are absolutes, that they won't change, that there are some things that are right and some things that are wrong. They do not know enough about past history in that respect to be able to make any predictions about the future.

I could think of some rude words to use in that connection. Words that are still rude now, and I think it quite possible that 20 years from now on this same platform I could use those words and not produce any shock around the room. For things do change. And words which we consider utterly indecent at the present time may very possibly simply be used as tags, as terms with no emotional connotation to them, 20 years from now.

But we happen to live in a period of sudden and drastic change in a good many of the things that happen to us. And I think it is extremely important that we be prepared for that change, and for

that reason I think that science fiction fans are better prepared to face the future than the ordinary run of the people around them, because they believe in change.

To that extent, I think that science fiction—even the corniest of it, even the most outlandish of it, no matter how badly it's written—has a distinct therapeutic value because *all* of it has as its primary postulate that the world *does* change, and I cannot overemphasize the importance of that idea in these days. Unless you believe in that, unless you are prepared for it—as I know all of you are—you can't retain your sanity these days; it's an impossibility. When a man makes predictions and they keep failing to come out, time and again, things don't come out the way he wants to, he goes insane, functionally insane—it's been proved in the laboratories time and again. It's been proved with respect to men, but I'll give an illustration with respect to animals . . . the well-known experiment performed with rats, in which a rat was disappointed in his predictions time and again, and he went crazy. It happens to work the same way with men. Things do not necessarily work the same way with animals as they do with men, but in this case there is data to prove it, and the inability to believe in change makes absolutely certain that your prediction will disappoint you. That does not apply to this group but it does apply to a great many people.

For that reason I believe that we are in—we are now entering into, and are already part way into—a period in which large portions of the human race will be in a condition of, if not insanity, at least un-sanity. I think we see that over a large portion of the world today, that we see it in the United States today; I think we have seen it crawling up on us for a number of years. In 1929 we had the market crash and people jumped out of the window from not being able to predict things that were perfectly obvious, written on the face of the culture, something that would happen.

And the Depression came along, and the madhouses filled up again, and other only slightly less slap-happy individuals proceeded to be a little bit unsane by concocting the most wildly unscientific schemes for making everybody rich by playing musical chairs, that sort of thing. Not quite crazy—they could still find their way around and take street-cars and not get lost; but not quite sane either. And that kind of thing can lead, if it goes on enough, to a condition of mass insanity that none of us are going

to like.

Nevertheless, we science fictionists, I think, are better prepared for it than others. During a period of racial insanity, mass psychoses, hysteria, manic depression, paranoid, that sort of thing, it is possible for a man who believes in change to hold on, to arrest his judgment . . . to go slow . . . to take a look at the facts, and not be badly hurt. Oh, things probably will happen to us, very unpleasant indeed—we can't separate ourselves from the matrix in which we find ourselves. Nevertheless, WE stand a chance, for I am very much afraid—and I speak quite seriously in this—I am very much afraid that a great many people of the type who laugh at us for dealing with this stuff, will not be able to hang on.

The important thing about it is to hang on to your sanity, to preserve your sanity while it happens, no matter what bad things may happen to the world. As individuals it may be difficult for us to do anything about it, even though all of us in our own way and according to our lights are trying to do something about it. But this series of wars that we find the world in now may go on for another 5 years, 10 years, it may go 20 years, it may go 50 years—you and I may not live to see the end of it. I personally have hopes—wishful thinking—I have hopes it will terminate quickly enough so that I can pass the rest of my lifetime in comparative peace and comfort. But I'm not optimistic about it. And during such a period it is really a difficult thing to keep a grip, to keep a grip on yourself; but I think that we are better prepared to do it than some of the others.

I can speak more freely here than I could in, for example, in a political meeting, because it's a highly selected group. I've known quite a lot of science fiction fans, and I've observed, statistically, certain things about them. Most of them are young as compared with other groups, most of them are extremely precocious—quite brilliant—I'd be very much interested to see IQs run on a typical group of fans. But even without running IQs I know that—know that most of the people in here are *way* above the average in intelligence, I've had enough data on it to know. I'm not trying to flatter you, I'm not interested in it. I *am* interested in the fact that you have unusually keen minds. However, that fact lays us open—and I included myself in it—lays us open to dangers that don't hit the more phlegmatic, the more stolid. We—unless we are able to predict, unless we are able to observe the data—

are even more likely to be subjected to funtional insanities than those around us.

I'm preaching—sure; I know that. I could have filled up a speech with wise-cracks and with stories and anecdotes; but I feel very deeply serious about this. I mean it. And if you can bear with me for a few minutes along this line, I still want to talk about it.

There's a way out, there's a way out, there's something that we can do to protect ourselves, something that would protect the rest of the human race from the sort of things that are happening to them and are going to happen to them. It's very simple and it's right down our alley: the use of the *scientific method*.

I'm not talking about the scientific method in the laboratory. The scientific method can be used to protect our sanity, to protect ourselves from serious difficulties of other sorts—gettin' our teeth smashed in, and things like that—in our everyday life, 24 hours of the day.

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**“Semantics is simply a study of the symbols we use to communicate. General semantics investigates how we evaluate in the use of those symbols.”**

---

I should say what I mean by the scientific method. Since I have to make the definition in terms of words, I can't be as clear as I otherwise might be, if I were able to make an extensional definition on it. But I mean a comparatively simple thing by the scientific method: the ability to look at what goes on around you . . . listen to what you hear . . . observe . . . note facts . . . delay your judgment . . . and make your own predictions. That's all, really all there is to the scientific method: To be able to distinguish facts from non-facts.

I used the term “fact.” I used it in a technical sense, and I should say what I mean by a fact. A fact is anything that has happened before this moment, on July 4th, 1941. Anything that has already happened before this moment. Anything after this moment is a non-fact. Most people can't distinguish between them, they regard as a *fact* that they're going to get up and have breakfast tomorrow morning. They get the difference be-

tween facts and nonfacts completely mixed up, and, in particular, these days people are getting very mixed up between facts and theories, isms, ologies, so forth and so on, so-called “laws of nature,” depending on what year you happen to be speaking.

That distinction between fact and fiction, fact and nonfact, is of extreme importance to us now. It even has become a strong issue in the field of science fiction. Without referring to any movement by name, or any person by name, simply because I wish to make an illustration—this is an illustrative point and has no personal . . . nothing personal with respect to anyone—I want to invite your attention to the fact that the science fiction field has been very much stirred up by a semi-political movement which uses the word “fact” quite extensively. But it uses the word fact with reference to what they are . . . what they *predict*, will happen in the future; and that's a nonfact. And any movement, institution, any theory, which does not make a clear and decided distinction between fact and nonfact, cannot by any stretch of the imagination be called a scientific movement. It simply is not because it does not use the scientific method. No matter how complicated the terminology may be, or how much they may use the *argot* of science.

I want to make another comment on the matter of science fiction and the fact that you and I have to put up with an awful lot of guff from people because of the orthodox point of view with which it is regarded.

I have never been able to understand quite why it is that the historical novel is the most approved, the most, uh, oh, uh what's the word? give me a word quick—yes, the most *sacred* (word supplied by Mrs. Heinlein from floor)—forms of literature. The contemporary novel is next so; but the historical novel, if you write an historical that's, *oh*, that's *literature*.

I think that the corniest tripe published in a science fiction magazine (and some of it isn't too hot, we know that; some of my stuff isn't so hot) uh, beats all the Anthony Adverses and Gone With the Winds that were ever published, because at least it does include in it that one distinctly human-like attempt to predict the future.

One would think in the attitude on that subject that the literary critics and the professors of English and so forth—those who make a business of deciding what is good and what is bad in litera-

*/turn to page 96*



***you are  
in my power,  
you will do  
what I  
tell you***

---



**T**he FBI nark in the group, relayed the message to the proper contact in the White House security force. They knew the dissident was coming even before he left his college with the *plastique* strapped to his thigh. They knew who he was when he got off the bus at the Washington Greyhound terminal. The security force had informed the President that morning, and in a mood of jocular camaraderie he had asked the protection boys if he could trip the switch.

Now the campus dissident, the activist prepared to sacrifice his life to rid the United States of a man who had become unsupportably repressive, came up Pennsylvania Avenue. The men gathered around the President's desk could not see him, but the tiny machine on the desk buzzed in frequency sequence. When the buzzing indicated the college boy was within a mile of the White House, the President depressed the red button.

On the street, a mile away, the boy suddenly went limp, his legs went out from under him, a searing pain shot through his skull, and he tore at his eyes. The pain went on. He was in hell.

He was nearly comatose minutes later as the security men and the physician climbed out of the anonymous black sedan and reached the sprawled body.

"Jesus," said one of the security cops in awe.

The doctor kneeled beside the fallen college boy. "How it must hurt," he murmured. Unconsciously he touched the almost unnoticeable hairline scar above his own right ear—the thin mark that ensured his loyalty to the President. Or to whoever else pushed the button.

On the pavement the prostrate rebel made a thin forced sound in his throat. Then his eyes rolled upward in their sockets and he made the sound again. But cut off.

"Massive shock," said the doctor, and shook his head. "He's had it."

**F**ar out? Science-fiction? Hardly. The technique described above exists now. It's here. Waiting to be used.

The millenium of mechanized mind control is upon us. Not only can brains be washed, but they can also be whirled, fluffed, tumbled and spun dry. Mind bending. Everybody's dabbling with it: Madison Avenue, the communications media, law enforcement crowd-control authorities, the drug set. And now, the electronics specialists are zeroing in on the manipulation and modification of behavior.

Let's count down some portraits of the future. Perhaps *your* future:

### 3. THE TRANSISTORIZED TURN-ON

A reward: Picture a man making love.

Not with a woman—he's alone, sitting quietly in an easy chair. There is a cluster of filament-sized electrodes implanted in his skull. One end protrudes through the scalp and performs as an antenna. The other end of the wires leads to a miniaturized radio transceiver buried under the bone, within the brain itself. Tiny metal filaments fork out from the radio. The device serves in a dual role; it can broadcast the pattern of electrical activity in the man's brain. Or it can pick up radio impulses from outside the man's skull and relay them inward.

On the chair's arm is a small black box—a remote-control with a red button. The man pushes the button, the impulse flashes and the transceiver feeds an electrical stimulus into the man's mental pleasure-center. For the button-pusher, it's ecstasy. Pure pleasure, undistilled and unfiltered. It's all the physical pleasure of making love, but without the troublesome bother: no wasted time with social amenities, wooing, seduction, foreplay or oh-darling-when-it's-over-don't-go-to-sleep-please-talk-to-me.

Just by pushing the button. The man presses it again and again and—

or

**Punishment:** The same man, the same radio inside his skull, the same little black box. Except now the man doesn't push the button; someone else does. And

article/Ed Bryant

# More and more mental research is aimed at behavior control and/or modification, with unpredictable future results.

the impulse isn't the same. It's relayed to a different area in the man's brain.

The pain-center. Agony—unalloyed and unremitting.

As in the first scenario in this article, perhaps the man is a political offender. A malcontent. Or maybe a criminal. He can be punished. All it takes is a finger on the button and the current flows to his pain-center. The perfect torture: absolute, neat, simple and by remote control.

No technological innovation comes out of a vacuum. Behind every device and process is a person, or a team, or sometimes both. That holds true for the electronic mind benders as it does for any other area of scientific development.

One of the leaders in ESB (electrical stimulation of the brain) is Dr. Jose M. R. Delgado of the Yale University School of Medicine. Dr. Delgado's research and development has dealt directly with the concept of wiring brains for purposes of forced learning and control; the radio hookup which broadcasts reports of the subject's brain-activity to the researchers, and carries back the commands which alter its behavior.

Dr. Delgado's experiments were carried out chiefly with rhesus monkeys. But human volunteers have also undergone experimentation through electric stimulation of certain areas of the brain.

The results are disquieting to anyone sensitive to Big Brother's specter as 1984 inexorably approaches. In his reports, Dr. Delgado states that electrical impulses implemented a patient's "friendly attitude" toward the research team.

Other experiments indicate that impulses to a patient's temporal lobe tend to obstruct his thinking processes. Dr. Delgado reports that various electrical stimuli cause reactions ranging from fear to happy laughter.

Perhaps the most ominous aspect is Delgado's statement about his own work, as reported in *Newsweek*: "We have developed something like a cerebral pacemaker, driving the brain as cardiac specialists can drive the heart."

Of course, morality is all in what you do with ESB. Dr. Peter Breggin of the Washington School of Psychiatry says: "The totalitarian potential is beyond belief—a permanent set of buttons for pain and pleasure which other people can control . . . these portable stimulators can be manipulated by remote control, even by computers at a distance."

Interestingly enough, researchers at the University of Connecticut have already been experimenting on a mild

level with the use of electricity as a punitive measure. Scientists monitored the interactions of two groups of extreme conservatives and liberals (determined by response to a political questionnaire). The laboratory situation was such that the subjects had the opportunity to administer electric shocks to one another. *Science News* reported:

"Radicals tended to give intense shocks of short duration, especially to the conservatives. Conservatives gave less intense but longer shocks, especially to the radicals. The researchers feel the radicals acted intentionally but felt immediate guilt. Thus the short shock. The conservatives, they say, were less aware of attempts to punish the other person. They did it subconsciously with the low intensity shock. The conservatives could have inflicted great pain had the long shock been real."

Not that any profound conclusions can be drawn from the Connecticut experiment. But there's some opportunity for interesting political speculation.

## 2. PUSH-BUTTON PAINKILLER

So far, this article has dealt with rather ominous matters. But not all the news is bad. Machines playing with your cerebrum can be good for you. For example:

There's no doubt about it, angina pectoris hurts like hell. It's like a giant predatory bird sticking its claws into your chest, grabbing your heart and squeezing it with red-hot metal talons. The agonizing vise-like pain can last for an hour. More than a million and a half Americans have felt it.

Angina pectoris is caused by coronary arteries which have been narrowed by atherosclerosis. Attacks are triggered by any form of strain, either physical (such as shoveling a walk) or emotional. Presently there are two forms of treatment—drugs and physical inactivity. Neither is pleasant. Both function by increasing the flow of oxygenated blood to the heart and decreasing the heart's oxygen requirement. But drugs, with a number of angina patients, are not wholly efficacious, and there may be unpleasant side effects such as headaches or faintness. And enforced inactivity may reduce the patient to helpless incapacity.

But just think, what if the pain could be as easily turned off as a light switch—at the touch of a button?

The plan: A three-hour operation (2X2-inch incision below the collarbone) and insertion of a radio receiver

about 1½ inches in diameter beneath the skin. Simultaneously the carotid sinuses on either side of the neck are surgically joined to electrodes and radio. With all components in place, the incisions are closed.

The next step: A disk-shaped induction coil is taped to the patient's chest, above the radio. The coil is then connected to a cigarette-pack sized power source clipped to the patient's belt.

Result: Heart-pain appears, the patient presses a button on his power-pack and a timed one-minute electrical impulse passes from the induction coil to the buried radio receiver. The radio relays the impulse to the carotid sinuses which signal the heart through the autonomic nervous system to slow down. Pressure on the heart is reduced—and the pain is eliminated. Instantly, with no side effects. Just by pressing a button.

The people responsible for this feat are Drs. Eugene and Nina Braunwald, Andrew S. Wechsler, Gerald Glick and Stephen Epstein, the team that developed the carotid-sinus nerve stimulator. That's the little box that blanks out the pain of angina pectoris. Dr. Braunwald reports patients who have successfully used the stimulator for more than a year. He predicts that eventually the device will be mass produced at a price under \$600 per unit. The only required maintenance will be replacing the batteries.

## 1. SAFE AND GENTLE, SLEEP, SLEEP, SLEEP . . .

Even the most modern techniques of anesthesia leave something to be desired. If you've ever come out of a pain-killing drug or gas with nausea or dizziness, you know why. Again, there's a better way.

Not only can electricity eliminate a patient's pain, but it can also put him to sleep. Place a headset above the ears; platinum electrodes deliver a current of between 50 and 150 milliamperes; instant sleep. After the device is turned off, the patient awakens within five minutes.

Theory says that electrical current circuits pain impulses in the thalamus while it also acts on the reticular formation. The latter brain area is believed to be the mind's "sleep-center." But whatever the precise process, the patient is put to sleep painlessly and with apparent safety.

The geniuses responsible are Drs. William Dornette and James Price, two Memphis anesthesiologists. They are

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## Some devices now allow man to modify his own mental processes, whether he is qualified to do so or not.

pioneering the methods of electrical anesthesia. The doctors have tested their device on more than seventy patients between the ages of four and 81. Operations from tonsillectomies to abdominal cancer surgery were performed while the patient slept; electricity to the thalamus blocked pain; current to the reticular formation caused unconsciousness.

or

The Hypnotron. This device feeds a weak flickering current to the brain via electrodes attached to the eyelids. Visual patterns are stimulated in the eyes and the brain is kept awake. Used in conjunction with verbal suggestion, this method can induce a hypnotic state in the patient. Thus it can be used as an alternative to anesthesia. Or the hypnotic state can be useful in psychotherapy.

And it's all done with wires.

Behind this device is Beverly Hills psychiatrist Dr. Bernard Gindes. Dr. Gindes says that the average rate of success of the usual hypnotist is 20%. He claims a nearly 100% rate with the Hypnotron. The psychiatrist foresees the day when the Hypnotron, used by a trained doctor, will replace drug or gas anesthesia in most medical or dental cases.

### 0. BIOFEEDBACK FOR FUN AND PROFIT.

Gadgets; little black boxes; flashing electronic displays that put Hollywood SF movie sets to shame. Let's get back to the over-view. Despite Pavlov, Dr. Delgado, or *The Manchurian Candidate*, all does not hint gloom in the Orwellian world of behavior modification. Researchers at Rockefeller University in New York, the University of California Medical Center in San Francisco, the Cornell Medical Center, Harvard Medical School and other similar institutions are aiding and abetting cooperation between mind and machine to give the brain dramatic new powers.

Scientists have long distinguished between the voluntary and autonomic systems of the human body: one can consciously direct his fist to close but not his heart to stop, wiggle his toes but not affect the output of his endocrine system, and so on. No longer so. Evidence is mounting that we can learn to consciously control such functions as our brain waves, heart beat and blood pressure.

It all started, as do so many medical advances, with rats. Dr. Neal Miller of

Rockefeller University discovered that animals could be taught to increase or decrease their rate of heart beat. The method was simple conditioning; when a rat's heart deviated from the norm, the animal received a reward. It took little time for the rat to learn to alter its heart beat in whatever direction would bring food. By the same method, rats were taught to control the rate of their kidney functions, regulate the pattern of their brain waves and change the amount of blood passing through their stomach walls; all at the direction of the experimenter.

Human beings can do it, too. Electronic monitoring devices are attached to the subject. If the machines are checking cardiac activity, the subject is alerted when his heart beat slows or increases. Eventually this continual consciousness of heart activity leads to the ability to control the rate. But exactly how it happens—that's still a mystery. Rats can do it; we can do it; but no one understands the exact mechanics of the process.

And then there's the brain. In San Francisco, Dr. Joseph Kamiya of the Porter Neuropsychiatric Institute of the University of California Medical Center can teach people to control their brain waves. He monitors their brain-wave activity with an electroencephalograph. Much as with Dr. Miller's heart beat training, subjects soon learn to produce the alpha-wave profile—the brain-wave pattern that produces feelings of ease and alertness in the subject. (Oriental researchers report that the alpha-wave pattern is characteristic of the brain waves of Buddhist mystics.)

Over the past three years biofeedback mechanisms have become a highly commercial, much-exploited market. One of many examples is the EEGOR (for EEG Operant Receiver), manufactured and sold by the Mind Tool Company of Oakland, California. The EEGOR, according to the firm's advertisement, "is a precision instrument that electronically mirrors your awareness. It is specifically designed for versatile, long-range use by the intelligent public."

Proponents of biofeedback see alpha wave control as a technique for conquering a spectrum of human problems ranging from hypertension, headaches and insomnia, to helping slow readers.

Some opposition has, of course, sprung up. In alpha wave experiments at the Harvard University Medical

School, it was reported that "any psychological benefits from the use of alpha-rhythm feedback machines now on the market may not be due to the alpha rhythm itself, but rather to the placebo effect resulting from the application of electrodes to the scalp." That is, people who think they are being helped by biofeedback will psych themselves into health because they believe in the gadget they're attached to. Mind over matter . . .

Quentin R. Regestein, one of the Harvard researchers, told the American Psychosomatic Society that the subjects reported boredom rather than psychological stimulation.

It will be ironic if one of the side-effects of biofeedback development is that modern science's latest advance has been to bring us a new and more efficient way of achieving ennui.

### -I. WHAT HAVE YOU GOT TO LOSE? YOUR MIND?

But is there not a clear difference between Dr. Kamiya's brain training and Dr. Delgado's control-box; a difference of enormous degree between influence through monitoring and direct electronic coercion?

The answers go beyond simplistic moral judgments. It's not enough to say it's all in the nature of the usage. (e.g. Automobiles do not kill people; drivers do. Guns do not kill; men who pull triggers do. Brain-affecting electronic gadgets are not good or evil; it's all in how they are used.) Glib slogans just don't make it any more.

The situation is comparable to the advent of the atomic bomb and nuclear energy: "Okay, it's here. Now what are we going to do with it?"

Well, the hardware's available; and people can never resist the shiny glitter of glamorous gadgets. And there seem always to be people whose dearest wish it is to affect the lives of others. Perhaps the best the public can hope for is to be made aware of some of the options and alternatives with which they may be faced. They? You. Make your choices; otherwise the choices will be made for you.

Keep the EEGOR in mind . . . only \$59.50 exclusive of tax . . . one year guarantee on electronics and workmanship . . . 10 day money-back trial period! Tinker with your brain to control your actions, reactions, pain, pleasure, tension, ulcers and indigestion. The cybernetic cure-all.

What have you got to lose? O



# the deadly invasion



**T**hey were out there again.

Swishing the luke-warm coffee around in his mouth, Bob Lewis peered out the dust-coated window at the Carters' front yard. Perhaps a score of times this summer he had stood at the kitchen window staring at the new neighbors. When they had moved in two months ago, they had seemed friendly and *normal*, but now . . .

He swallowed the bitter liquid with a gulp and eyed the Carter family. The fortyish couple and their teen-aged son and daughter were sprawled in the ever-present deck chairs. The four chairs were always stationed in exactly the same spot on the freshly-mowed lawn. They were placed so close together that the armrest of one chair touched the armrest of another.

The entire family spent six to eight hours a day, every day—except for the few that it rained in south New Mexico—stretching out in the parallel chairs and basking in the white-hot sunlight. Today was a scorcher and they were out there again.

Bob and his wife, Phyllis, had often discussed the oddities of the Carters' sunbathing. For one thing, they never wore sunglasses, even though they often gazed at the golden sun for what seemed like several full minutes. Of course, from Bob's window to the Carters' front yard was a good forty yards and even with his 20-20 vision many details were lost. Also, they never turned over on their stomachs. They remained for hours strictly on their backs, with their faces full front to the sun. They never read magazines or books while they sunbathed. They never talked to each other. They just lay there motionless, basking.

Setting the cup with the chipped lip on the counter top, Bob made a decision. Walking back to the master bedroom, he dug through the contents of the oak dresser's bottom drawers. Finally, he found the binoculars he hadn't used in five or six years—not since the infamous football game between State and Marshall.

Back at the kitchen window, he gazed through the large eye pieces. The minute details lost to his vision because of the distance suddenly exploded to clarity. The chiseled chin of Mr. Carter came into view. His eyes were closed. A fly

hovered just above his iron-gray eyebrows.

Moving the binoculars to the left, he focused on Mrs. Carter. Her eyes were open wide. She seemed to be staring at the blazing ball of fire above. Her long, tawny hair cascaded around her shoulders and fell to meet the full swell of her breasts peeking from the top of the skimpy bikini. She had a button nose.

Next, the son, James, Bob thought his name was, came into view. He, too, seemed entranced by the amber sun. He had muted red hair. A shower of freckles covered his face. His bathing suit was fashioned after an American flag, adorned with large white stars, a blue background and broad red and white stripes.

Bob moved the field glasses to look at the remaining Carter—the daughter. Perhaps fourteen, she also was staring at the sun. Her blue eyes never blinked. She did not flinch at the strong sunlight. Beads of perspiration formed on her forehead. A couple of the drops merged and, creating a rivulet, trickled down her rosy-toned cheek. She, too, wore a bikini, but her endowments were not as noticeable as her mother's.

As he moved the binoculars slowly along the line of reclining bodies, Bob stopped abruptly. Something he had noticed through the lenses finally registered within the cells of his brain. Halting the panoramic motion of the binoculars, he trained them on a point between two of the deck chairs—the point where the armrests touched. He adjusted the focus.

Goddamn, what the hell was it! A tiny, metallic spiral, like a fine bit for a drill, connected the two chairs. He looked at the armrests of the other two chairs. A metal helix connected them also.

He didn't know what was going on, but he was determined to find out.

**T**he moon was full that night. About ten, maybe fifteen minutes after, Bob walked across the house-lined street to the sidewalk that ran in front of the Carter house. No lights were on in the front part of the house. Looking cautiously up and down the street, he eased onto the sweet-smelling Bermuda grass.

Almost in a crouch, he inched up to

the side-by-side deck chairs. Stepping behind the chairs, he knelt and began to examine the connected armrests. The spiral wire, gleaming in the moonlight, linked the arms of the chairs. Running his calloused hand along the backs of the chairs, he discovered that the same wire joined all four.

With his hand, Bob continued to follow the wire to the last chair. The flexible spiral dropped from the last armrest into the sea of narrow green blades. He pursued the wire by lifting it out of the grass. The electrical power cord attached to the end of the spiral wire came into view—at the same instant Mr. Carter stepped from the shadows draping the side of his house.

The unusual neighbor walked over and towered over Bob. Bob's heart pounded against the inside of his chest. His mouth was dry.

The neighbor said nothing.

Bob stood up slowly, the muscles in his legs quivering.

They stared at each other.

Half a minute passed. He still said nothing.

Bob inched backward.

The silence was like an explosion.

With the speed of molasses being poured on a December morning, the broad-shouldered man began to raise his arm. The seemingly exaggerated gesture was only half completed when the image of a gun attached to the end of the moving arm flashed through Bob's mind. Glancing down at his neighbor's hand, Bob could not see if he had a gun or not. The hand was lost in the hollow blackness of shadows. The harsh light of the pock-marked moon, a bright circle dangling in the midnight sky, caused the eerie, concealing shadows.

Suddenly, almost before he knew it, Bob was running. In case Mr. Carter hadn't recognized him, he decided to not run to his house. Down the deserted street he sprinted. The soles of his shoes slamming against the coarse pavement were in unison with the violent pounding of his heart.

Bob looked back once. The strange neighbor was standing on the sidewalk, glaring down the street after him. Bob wasn't sure, but for an instant he thought he saw a glint of moonlight off the barrel of a gun—or some type of weapon, anyway. Instinctively, he darted to the right,

into a row of hedges. No shot followed. He continued running.

Two hours later, he scaled his backyard fence and entered the house through the utility room door. In the bedroom, Phyllis was still sleeping. Her gentle, rhythmic breathing seemed to calm his still-racing heart.

He shed his sweat-soaked clothes and eased between the cool sheets.

A long time passed before sleep came. Just before he drifted off, Bob decided he was sure of two things: the Carters were not of this Earth and, to prove it, he would have to get inside their house.

In the morning they were out there again.

Downing his second cup of coffee, Bob watched them from the kitchen window. Like ducks, all in a row, they were sprawled in the incessant sunlight.

"Honey, what did you do to your arm?"

Phyllis's question catapulted Bob from his Carter-caused trance.

"What did you say, babe?"

"I said, 'What did you do to your arm?'"

Bob looked at his right arm. Nothing seemed wrong with it. Glancing at his left one, he found the reason for his wife's question. Half a dozen puffy, red scratches lined his forearm. He realized that the hedge he had plummeted into last night did more than conceal him.

"Oh, probably did it while working in the yard yesterday."

"I didn't know you worked in the yard yesterday."

"Just for a bit, before you came home."

Taking a bite out of a piece of dry toast, Phyllis changed the subject. "What time do you have to be at the office today?" She patted her auburn hair, forcing an errant strand into place.

"I'll probably go in about noon," Bob shrugged, as he stole a quick look out the window at the still-there Carters.

"What a life. I've got to work nine to five every day and you, the great science fiction writer, can come and go as you please."

"Now, baby, it's not exactly like that," he chuckled.

"I know, but sometimes . . ." Phyllis glanced at her watch. "Oh, got to run.

You can finish this toast." She pecked him on the cheek. "See ya tonight 'Bye." She went out the door.

About a minute passed before Bob heard the Continental start and purr quietly as it rolled out the driveway. With his wife gone, he returned his concentration to the Carters.

Even though the day had just begun, it was already hot outside. Inside, the compressor of Bob's air conditioner shifted into a more labored hum.

"And those weird people will be out there all day," he said aloud, to himself and the walls. "Out there all day"—the phrase mushroomed in his mind. Why hadn't he thought of it sooner? The Carters were always out baking in the sun during the day. At night they went inside. So, during the daytime, was the time to get inside their house.

"Damn it, today would be the day," Bob thought.

An hour later, he slipped out the side door of his house. Like a secret agent, he discreetly made his way to the Carters' back yard.

Nervously glancing around, Bob walked up to the house. The back door was ajar. He went inside.

No gigantic machine with blinking and pulsing lights greeted him. No large viewscreen used to contact their home planet hung from a wall. No crackle of electrical current surging through towering vacuum tube-like cylinders filled his ears.

A stack of egg-covered dishes sat unbothered in the sink. Two cups, half filled with a brown liquid, and three pieces of toast were on the dinette table.

Wondering if the cups contained some unknown drink, Bob sampled some of the dark fluid. Somewhat disappointed to find only cold coffee, he put the cup back on the table.

He knew the devices must be in another room. Cautiously, he walked out of the kitchen.

Peeking into the living room and formal dining area as he crept by, Bob saw nothing unusual. As he started down the long hallway, he heard something. He stopped.

Silence.

He started walking. The sound came again.

He stopped. The sound came. A low, */turn to page 91*

**Has Earth become the Palm Springs of the Galaxy? If not, why don't those new neighbors get a sunburn?**



# 2001 HYPOTHESIS

from page 23

have very sensitive receivers.

Such a repeated playback would undoubtedly attract the attention of the natives—imagine the surprise of Marconi if he had found a mysterious echo to every transmission he made. For our purposes, the matter might be laid to rest right there: Marconi heard no echoes, therefore such a probe doesn't exist. But transmissions were weak in the early days of radio, and may not have penetrated well through our ionosphere.

It is interesting that in 1935 Stormer and van der Pol, studying the atmospheric propagation of radio waves, detected several cases of radio echo, many seconds after the original signal. The time lag indicated reflection from an object more than twice as far away as the moon. Since then, nothing to my knowledge has appeared in the scientific literature about this phenomenon, and no ready explanation is forthcoming.

It seems unlikely that a probe orbiting around our sun would simply stay there, giving no sign of its presence and waiting to be found. Picking out even a mile-sized object that far away is very difficult. Even if it was spotted by telescope, it would simply be written off as another asteroid. There would be no particular reason to visit it.

One place we have visited at great cost, and will probably go on visiting, is our moon. Why not put the artifact—whether monolith, sentinel, legacy or some unimaginable variant—on the moon? It would be difficult to ensure the stability of orbits around the sun or Earth for millions of years, but planting the artifact on the moon would anchor it securely so that it would not gradually drift away from Earth.

Once on the moon, covering the artifact with a few feet of dust would bring another benefit: no more erosion by particles streaming out of the sun (the solar wind) or interstellar space (cosmic rays). True, by the same stroke it becomes vulnerable to the occasional geological activity on the moon. Also, large incoming meteorites could still damage it. These are unavoidable dangers, but by leaving several widely spaced artifacts scattered over the moon, the odds against all of them being destroyed by outsized meteorites can be made quite good.

There is another trouble with this theory—man has circled the moon and landed on it, and no friendly radio message has come out to greet him. Should we conclude that nothing is waiting for us there? Not necessarily.

For one thing, Kubrick and Clarke could be right. The tipoff that a monolith

lies buried somewhere may be subtle, such as a local warping of the magnetic field. Or, as in "The Sentinel," the object may be a small pyramid sitting atop a mountain peak which literally must be stumbled across before men recognize it for what it is. If these ideas are right, only a full-scale exploration of our moon will turn up anything interesting.

On the other hand, the radiation damage mentioned above may be more important than we think. Sensitive electronic components made today cannot withstand constant bombardment by high-energy particles; they must be shielded. If the alien artifact is to remain on the moon, operating for millions or even billions of years, blocking out the radiation must be a very serious matter. This means the object will be buried quite deep—perhaps a hundred yards or more beneath the surface. The moon dust and gravel above it will stop particles, yes—and also radio transmissions.

To get around this, it would probably be best to have the artifact protrude a radio antenna to the surface periodically. There it would listen for transmissions from the Earth. The Sun is noisy in the radio wavelengths; note how difficult even local reception is during the flareup of sunspots. To cut down on this noise, a sophisticated artifact would probably surface its antenna when the sun is not above the moon's horizon.

What is a reasonable interval between appearances of the antenna? There is absolutely no way to tell. Over the long wearing course of eons, even a simple matter of extending an antenna can run afoul of accidents, so the period should not be too short. On the other hand, if the artifact were left in the first place to keep track of how rapidly humanity advanced, a frequency of once a century would not be unreasonable.

All these factors depend strongly on precisely why the artifact was left. If it is a technological sentinel, to announce our graduation to the spaceflight level, the moon is a good site. Even better, place it on the moon's other side, away from Earth. Then no freak radio contact with an Earthbound station would have occurred in our history. (One explanation of the Stormer and van der Pol echoes might be that sentinel on the near side of the moon made contact in 1935, and then broke it off for some reason.)

If something is buried on the moon's far side, and it does not surface frequently, contact with it may be postponed indefinitely. NASA plans (and probably Soviet ones, too) call for very little activity on the far side in the fore-

seeable future—and difficulty of direct radio communication is one of the reasons. We may be in for a long wait for a call from a far-side sentinel. Nonetheless, it would be wise to keep an ear cocked for a stray signal that might be an aged but still functioning near-side sentinel, struggling to get through our ionosphere and be picked out of the commercially-generated noise we ourselves are making. It would be ironic if we were blotting out word from the stars with a thick layer of corn flakes advertisements and *Star Trek* episodes.

Still, there is another role an alien artifact might play that leaves open unexplored avenues: the legacy. Earth's visitors may have erected a memorial to themselves, a message to the future inhabitants. On a small metallic chip we can even now write an enormous wealth of knowledge; not much space would be required to leave a rich library inside some relatively indestructible vault.

Much cannot be conveyed by simple language alone, as every artist will tell you, and so objects might be left in the vault as well. Such a legacy would be of unimaginable benefit to mankind, a sort of colossal Pharaoh's tomb containing new science and new cultures. Discovery of this legacy would be the most important event in human history.

The legacy could be left in the places we've already discussed—in distant orbit, or on the moon. But our visitors may be very wise beings indeed, and realize that all cultures need not develop very far technologically. What if Earth's natives never reached orbit or the moon?

Lacking any data, we have no idea how probable it is that intelligence and technology are linked. Certainly if Earth were a planet of an older star, our crust would have fewer metals and heavy elements and we would have a hard time building space ships. More to the point, do intelligent creatures necessarily *desire* technology? Our visitors must—otherwise they would never get here—but they might have encountered races who simply didn't think along technological lines.

We may have an example of such a race already on Earth: the dolphins. Our descendants may well remember our inability to recognize dolphin intelligence as our greatest folly, because men do habitually equate thinking with tool-making. But an alien visiting Earth 20 million years ago might have found the dolphins the obvious evolutionary path for high intelligence. Dolphins are

conspicuous in the oceans, but who would take the time to scour the African forests for elusive tribes of tool-using primates? Or, realizing that dolphins and primates (which are the same age, evolutionarily) both had a good chance to form civilizations, aliens might have decided to leave a legacy which would be reached by both species.

After all, if you're leaving a legacy for a race you will very probably never meet again, does it matter whether they are fish or land-rover, tool users or not? The dolphins might never discover fire, develop chemical fuels or alloy metals—they certainly haven't yet. So they couldn't reach the moon, even though they might have great use for the cultural record left by the visitors. Exploring the land would be difficult for dolphins, and flying in the air more so. The most obvious spot to leave a legacy for the dolphins would be the oceans.

The trouble with leaving any artifact beneath or near the wind, wave and tide of the sea is obvious, though—erosion. The aliens would need to be very sure their legacy would be read and understood very soon—in which case, why not just teach it directly to the dolphins during their visit? (Which raises an interesting possibility: perhaps the dolphins already have the legacy, transmit it by word of mouth to each generation and don't consider us worthy of receiving it.) In any case, an artifact left in the sea is gone by now.

There remains the possibility that the legacy might be left on land, either for us or for some future dolphin civilization. Where would it be?

Some place with little erosion, certainly, far from the oceans, away from areas of geological activity or places where large land animals could interfere with it. If the drifting of Earth's continents is typical of planets, and our visitors knew the dynamics of plate tectonics, etc., they could have selected sites with few earthquakes, volcanoes or other severe changes.

The erosion rate is high near mountains and glaciers, so we can write off the great mountain ranges and many sites too near the north or south poles. The great band of tectonic stress that loops over our planet like a baseball seam makes many other places—such as the California coast—unlikely. The Canadian sheet, a great area of very old, stable formations, would serve quite well if the glaciers had not so (relatively) lately steamrollered it. And so it goes for a large fraction of the Earth.

Two sites do look promising: the in-

terior desert of Australia and some southern portions of the Mongolian plateau. Australia offers the added bonus of being relatively cut off from Africa, where man apparently evolved. Our visitors might well have decided to leave any artifact as far from Africa as possible, reasoning that we would be further advanced by the time we found it.

Both these sites are relatively unexplored even today. Little grows there and few animals of any size are native. Many parts of Australia in particular are extremely hard to reach without mechanized transport or great endurance.

I am not a geologist and the matter of guessing what sites have been most stable for very long times is a complicated one, best left to experts. The only important point is that such sites may exist. Just this knowledge is not enough, though, because we still run into the essential mystery of this whole discussion: who (or what) are we dealing with? What sort of artifact would be left behind? How can we recognize it?

Obviously it must be artificial—that is, not made by natural processes. But after lying on the Earth's surface for perhaps millions of years, it could hardly look very artificial by now. It must be covered by dust and gravel at least, if not rock formations of much greater weight. Without knowing specifically what its builders had in mind we cannot reasonably guess whether it could be designed to stay above ground or not. It is impossible to say whether aliens who can fly between the stars (or send computerized ships instead) possess materials which can resist normal erosion, or have other special properties that give them away. Certainly if the artifact were large enough—say the size of a mountain—and very regular in shape, we could spot it easily enough. But how hard might it be to build such a thing? Advanced technology is really much the same as magic, as I said before, and we should always be prepared to be surprised. Size is an easy way to announce your presence, yes, but building things the size of mountains undoubtedly takes longer than something smaller. Maybe we should look for some more subtle beacon.

There are many attention-getting signs that do not depend on size—regular arrays, say, or differences in the quality of the light an object gives off. What kind of regularities? What sort of light? We can't really ask detailed questions about the inventiveness of alien minds: the possibilities are endless. The best we can do is look for the unexpected, and

look very thoroughly.

Here we are in luck. Recently the United States has completed the first detailed aerial photographic survey of our planet, made both from orbit and low-flying aircraft. Wide regions never before studied have been photographed through infrared and ultraviolet filters. The photographs are well systematized, so that information can be found from them conveniently and efficiently.

Some years ago, shortly after the first photos from Mars arrived via Mariner, it was pointed out that similar pictures of the Earth with an optical resolution of one kilometer would have shown no evidence of man's civilization. Certainly we will need far greater resolution to see one lone artifact standing in an arid desert. Thus photos which display great detail will have to be painstakingly analysed with a completely open mind. Preconceptions about what one is looking for will have to be discarded.

A curious arrangement of a ridge line, a concentric pattern of rock formations, perhaps an abnormally high reflectivity in the ultraviolet—any of these could be either pure accident or, on the other hand, the first subtle clue.

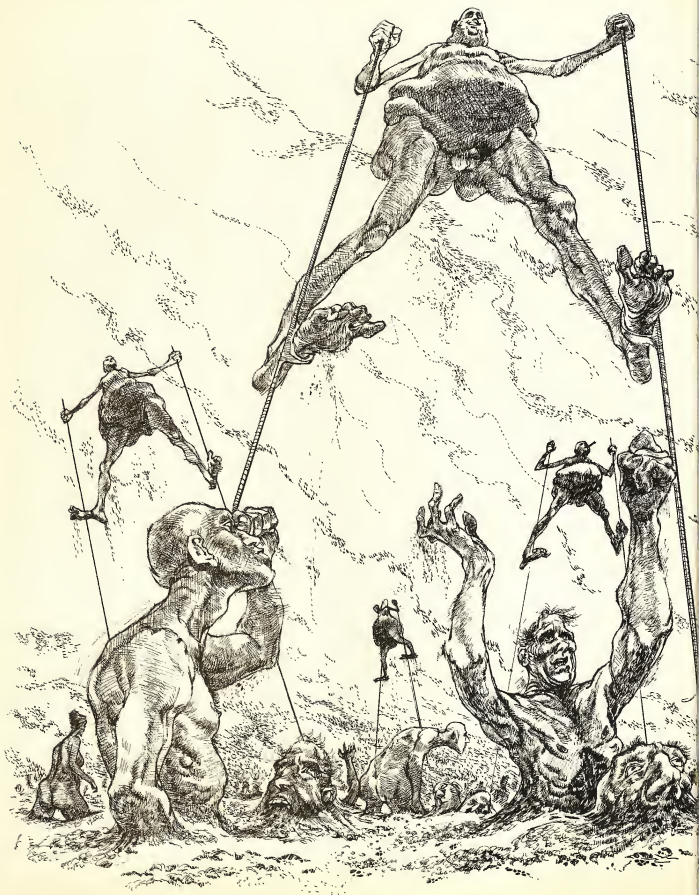
Admittedly, there may be nothing there to find in the Australian wastes or anywhere else. Perhaps other, older civilizations in our galaxy never traveled. They may—quite reasonably—spend their effort on the construction of great radio antennas and transmitters which can signal across the vast distances. But if any race has ever found itself alone, unable to reach other intelligences other than by space flight, they may have stopped here and admired our world in the distant past.

Any legacy they granted us is worth having. Indeed, our civilization might be liberated and saved by it. The raw photographic data for a detailed search already exists; the cost has already been paid. It will cost precious little more to have these photographs studied for small, seemingly unimportant features that betray a pattern or plan.

Such a survey, together with an alert watch for unexplained transmissions or small, unexpected objects in orbit near Earth, will require minimal effort but could bring truly infinite rewards. Even a quick, incomplete program would be highly interesting. If it is presented the right way, highly motivated people would undoubtedly be recruited to do the routine work.

I think the stakes are worth the gamble. Monolith, sentinel, legacy—whatever might be waiting, we should go and see.

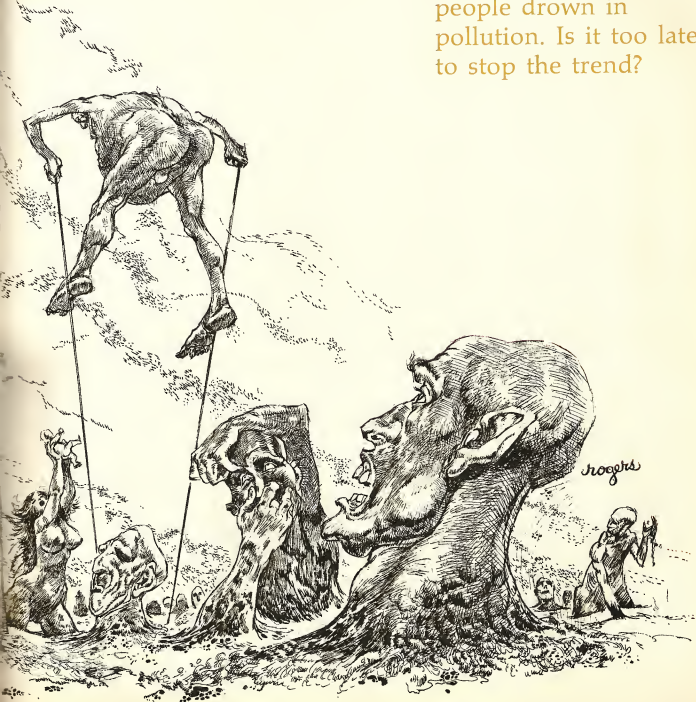




# We Ate The Whole Thing

fiction/Harry Harrison

The Corporations grow ever larger while the people drown in pollution. Is it too late to stop the trend?



The corporations—  
The Government. Is there  
really any difference?

What do you mean I better watch out for myself?" the heavyset, strong, tanned, scowling photographer said to the hollowchested, thin, fishbelly-skinned Naval ensign who barely reached his shoulders.

"I mean they are, Jesus!, tough here in New Orleans, particularly here on the waterfront. Some of these Picayuners would eat you soon as look at you."

McSwine laughed metallically and clapped the sailor on the back hard enough to set him in coughing. "Worry for your own ass, buddy, not for McSwine. When I was twelve years old I killed my first Commy for Christ in Nam, and we are eighteen wars later. Though now I take their pictures, I still kill one every chance I get. Which is more than I can say for your rustbucket Navy." He dismissed the effectiveness of the senior service with a disgusted wave of his arm that set his pendant cameras and equipment bags jumping. He settled them neatly back into place and looked out at the oily black surface of the Mississippi seething against the rusty hull of the submarine. There was a mist rising from the water that hurt his nose and deepened the night as it soaked up the light from the dock they were approaching. The steel plates beneath his feet rumbled some interior message and bells could be heard signalling distantly as they backwatered to a stop. Heavily armed longshoremen grabbed the thrown ropes and pushed a rattling gangway into place. The ensign looked nervously at McSwine and chewed at his thin moustache.

"You have to go alone, sir," he said. "We go on to the military dock, but there are guards waiting for you on shore...."

"Don't worry your pretty head, sonny. McSwine takes care of himself."

Grunting out a sound somewhere between a laugh and a snort of derision he stamped down the gangway and across the floodlit dock onto the walkway beyond. This extended through the darkness to the shore where more lights and guards waited. Halfway down its slippery, rotted length a dark figure rose silently behind him, dropped a wire loop over his head and garroted him. McSwine did not die easily. His eyes bulged from his head as he tore at the wire and kicked at the other figures who held his thrashing legs, but die he did and rather swiftly. And even as his heart was fluttering its last beat his cameras and identification were being stripped from him and passed to another man who had climbed up from the pirogue hidden beneath the gangway. He was as big as the

dead man and wore an identical jumpsuit. Before a minute had passed he had assumed the other's identity and was ready to proceed on his way—but not before he hissed a whisper to one of the men now lowering the corpse into the boat, the first sound in the entire operation.

"Remember, I get a cut of the meat money from the cannibatcher."

"Oui, Jean-Paul," was the murmured answer, and then they were gone.

Stamping as heavily as the man whose shoes he was planning to fill, Jean-Paul walked the length of the gangway and into the circle of light on the shore, where two hard-eyed policemen leaned their .50 calibre rapidfires in his direction and a sinister security officer in a dark coat and dueling scars gazed at him suspiciously from reddened eyes.

"You were told to come directly here, yet you stopped out there...."

"Sure," Jean-Paul said in the insulting tones of McSwine, leaning forward so his breath, heavy with garlic soylent could bathe the other's face. "I stopped to take a picture of your stinking Mississippi, poisoned forever by the sewage and industrial wastes of your corrupt city."

"At night!" the security officer choked, leaning back away from the sewage and industrial waste of the other's breath.

"Infra-red. The dead fish showed up fine."

The policeman checked Jean-Paul's identification with anger—which was, of course, why he had been made angry—instead of suspicion which might have

revealed the differences and forgeries involved. Muttering to himself he jerked his thumb in a gesture of dismissal, and Jean-Paul, a burly policeman on each side, walked towards the uninviting darkness of lower-level New Orleans.

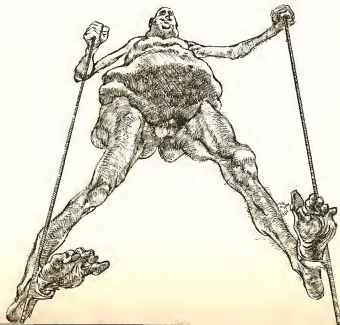
"Stay close, dudes," Jean-Paul said. "I don't want to be bumped by your Picayuners or lost in the tunnels." He almost smiled as he said this; he probably knew the lower levels better than they did.

"Shut up, you centgov slob," the policeman on his right said, turning on a bright handlight and shining it around into the shadows as he talked. "We no better, no worse, than wherever you come from."

"You worse. Mr. Trench has found out all about you and I'm gonna take his picture and pictures of all the stuff he found out and you gonna see it on holovision and see how bad you stink. What you think of that?"

What they thought of that was not revealed at the moment because a grenade suddenly blew a hole in the wall next to them. Their guns hammered quick answer into the darkness. By accustomed reflex, for surely their hearts were in sympathy with the people out there trying to kill him, they hurried him through the filthy corridors to the comparative safety of a waiting elevator. The operator, concealed in an armored, machine-gun mounted booth to the rear, examined them carefully before he raised the barrel grill.

"They got me!" Jean-Paul said, realizing suddenly that the side of his face was wet with blood where a fragment had nicked his skin. His associates were



being too realistic.

"Didn't get you enough!" the policeman said, and the two of them laughed happily as they pushed him into the elevator. They were still laughing when the armored door snapped shut.

"You the body for Mr. Trench?" the operator asked, his features dimly visible through the armored glass.

"Well who the hell do you think I am—the ghost of Dicky Nixon risen on the third day?" "Take me to Trench." Jean-Paul held his handkerchief to his cheek.

It was a slow ride as the screeching elevator rose protestingly through the slums of the lower levels, the manufacturing floors, the dormitories after that, then more dormitories, then administration—a needed barrier between the lower classes and the upper—until finally it groaned to a stop on top, just a few levels below the polluted fog of the night sky. Two more guards were waiting there. Neater, politer, more efficient—but just as dead as their brothers below.

**M**r. McSwine?" "You catch on quick."

"If you will step into the guardroom I would like to check your identification. Routine of course."

"It's a routine that's already been done. You dudes trying to hassle me?" The check had been expected, but Jean-Paul had to stay inside the well known public role of McSwine.

"Just a formality. In here if you please."

One guard stayed outside the cubicle while the other followed Jean-Paul in and locked the door behind them. Once inside he dropped his formal manner and actually smiled.

"I can't say what a pleasure it is to meet you, Mr. McSwine. Really is. You see, I'm sort of, in a small way of course, a kind of photographer myself."

"Great," Jean-Paul said, aware of a sudden sinking sensation in his gut. "You wouldn't sort of look at my dogtags so I could get out of here?"

"Don't worry, sir. No need to check your identity. But we have to be in here a couple of minutes like I was, so maybe we could have a drink, talk sort of. You like bourbon flavored plankton vodka. I know that from reading about you, and I saved and bought a bottle. Here you are, a big full glass."

"Great," the bogus McSwine grunted as he seized and drained the glass and fought to control a shudder. He loathed plankton vodka, no matter how it was flavored.

"My name is Hardesty, Mr. McSwine, and I'm in a photo club. A couple of hundred guys who own a camera. I get plenty of time to hold the camera, but getting black-M film is a hard job so I haven't taken many pictures. But if I could, I think I could maybe squeeze in as a police photographer. The one we got is kind of old. . . ."

"And maybe you could see he didn't get any older?"

"Ha-ha. Mr. McSwine, you catch on quickly. That's the way the world rolls, isn't it? What I would like to ask you is some technical things that none of the bums here know about, like when you took that holo shot of the President's assassin getting gunned down, right into the sun, which means you must have had your L-15 filter, yet you still caught color of the blood and stopped the bullets as they came out, which I thought was impossible in theory. Do you remember what opening, speed, diaphragm, grobus and film you used. . . .?"

Hardesty smiled sincerely. A big, tough, crooked, two-bit cop with ambitions always beyond his reach.

"I'll tell you," Jean-Paul said, hoping the sudden prickling of sweat was not showing, "but how's about another drink first?" Time. He needed time to think. Because the one thing he had *not* been briefed on was the photographer's trade. He didn't have the slightest idea what Hardesty was talking about.

Glass rattled against glass. Badly flavored, fish-fragrance haunted ethyl alcohol glugged out and he threw it down his throat, trying not to touch the sides, and thought and thought.

"I never tell, you know. Never tell a thing. That's a rule that I cannot break. But I can do something better, because I think you are the kind of guy that deserves it." *What?* The sweat was apparent now, but maybe the small room was hot. *What?* He leaned forward conspiratorily and winked at Hardesty, who was nodding like a simpleton, face aglow with happiness. *What?* Kill him? No good. Then the answer, born of desperation, clicked into his mind.

"Look at these cameras I have. Do you know what kind they are? Sure you do. Now look again and tell me which is the oldest and crummiest. Do you know?"

"Sure do, Mr. McSwine. That beatup Asahi Pentax is an antique, two D, no holo, I guess you use it for filling in and. . . ."

"Right, it's the one. There's a story behind it. An old, great photographer, you would know his name if I told you

but I ain't gonna tell you, gave it to me. When I was where you are, just starting. It was given to him, and so on, sort of a good luck camera. I been looking for the right guy to pass it on to and. . . you are him!"

There could be no trouble after this. Hardesty's hands trembled as he turned the camera over and over, unbelievably, finally and reluctantly locking it in a drawer. He did pull himself together some when they left and reassumed his stern role of policeman—but the gleam of an artist was in his eye. They walked quietly, not talking, through the ornate luxury of the residential corridor until they reached their destination door. Jean-Paul knew that he had made a mistake and now he had to cover it, which meant taking an even bigger chance. The second guard stopped at the end of the corridor by the elevator, so Jean-Paul had another moment of privacy with Hardesty.

"Hardesty, I just remembered. I think I've got a couple of extra rolls of film. Come back—" he looked at his watch, "—in exactly fifteen minutes; come alone, and I'll slip them to you. Got that? Time it right so I can be by the door and answer it so no one else knows what's happening."

"I'll be there," Hardesty whispered, winked, sweating himself now, then pressed the announcer by the door. The scanning light went on and he held up his identification before the eye. "I have Mr. McSwine here from New York to see Mr. Trench, security cleared all in the green."

The door hummed open and Jean-Paul walked in. When it clicked shut behind him he looked at his watch and then at the gray and worried little man who was walking towards him.

"Mr. Trench?" he asked.

"Yes. Of course. And this interview has to be brief. I am working. Tomorrow is the hearing. . . ."

"Is this brief enough?" Jean-Paul asked, stepping forward and hitting him with his balled fist just below the ear. Mr. Trench made a shrill gasping sound and fell instantly. Jean-Paul lifted his eyelid just to be sure he was really unconscious, then took out the tools that had been strapped inside his thigh and went swiftly to work. The vent plate was just where it had been in the mockup, and even as he took out the first screw that held it in place he was aware of a soft push of air and a distant thud. Good. They were on time on top as well. By the time he had the plate off and

/turn to page 88

# The Theory and Practice of Time Travel

article/Larry Niven

*Speculate: (2) To ponder a subject in its different aspects and relations; meditate; esp. to theorise from conjectures without sufficient evidence.*

—*Webster's New Collegiate Dictionary*, 1959

Once upon a time a man was given three wishes. He blew the first two, getting himself in such deep trouble that if he let either wish stand, he would suffer terribly. Now desperate, he cried, "I wish I'd never had a fairy godmother!" And the past healed to cancel both wishes.

The first time-travel story was a fairy tale—here drastically condensed.

Its theme is buried deep in the literature. L. Frank Baum used it in *THE WONDERFUL LAND OF OZ*. Cabell borrowed it for *THE SILVER STALLION*. Traditionally the protagonist may change the past without actually moving backward in time.

H. G. Wells, one of the fathers of modern science fiction, also fathered the time traveling *vehicle*. This may be the reason Wells' spiritual sons tend to treat time travel as science fiction rather than fantasy. But Wells wrote only of travel into the future. He missed the Grandfather Paradox and all the other derivative paradoxes of travel into the past. His time machine was a mere vehicle, no more remarkable than the gravity-shielding material, *Cavorite*.

Wells also missed the most important aspect of time travel: wish fulfillment. When a child prays, "Please, God, make

*Impossible, says Niven, because of (a), (b) and (c). So how come he writes such good stories about it?*

it didn't happen," he is inventing time travel in its essence. (He will probably give up the idea when he learns good English. More about that later.) The prime purpose of time travel is to change the past; and the prime danger is that the Traveler might change the past. The man who first thought of travel into the past combined the Wells machine with the fairy tale to produce time travel in its present form.

Time machines come in many forms. Wells' man-carrying vehicle was as open as a bicycle seat, with a magnificent view of time flashing past. Poul Anderson's standard issue time Patrol vehicle could do anything Wells' could, and fly too.

More restricted machines may travel only into the future, or may send only subatomic particles into the past, or may be restricted to things even less substantial: thoughts, dreams, emotional states. Others may move only in quantum jumps of a million or sixty million years. A writer who puts severe limits on his time machine, is generally limiting its ability to change the past in order to make his story less incredible.

**THE GRANDFATHER PARADOX** is basic to any discussion of time travel. It runs as follows:

At the age of eighty your grandfather invents a time machine. You hate the old man, so you steal the machine and take it sixty years back into the past and kill him. How can they suspect you?

But you've killed him before he can meet your grandmother. Thus you were never born. He didn't get a chance to build the time machine either.

But then you can't have killed him. Thus he may sire your father, who may sire you. Later there will be a time machine. . . .

You and the machine both do and do not exist. Paradox!

In general we will call any such interference with the past, especially self-cancelling interference, a Grandfather Paradox.

Travel into the past violates certain of what we regard as laws of nature. (1) A vehicle which travels from the thirtieth century AD to the twentieth, may be regarded as appearing from no-





where. Thus it violates the law of conservation of matter. If the vehicle carries a power source of any kind, it also violates conservation of energy... a quibble, as they are both the same law these days.

To say that an equivalent tonnage of matter disappears a thousand years later is no answer. For ten centuries there was an extra time machine around.

But things are even worse if a Grandfather Paradox is involved. One can imagine a centuries-old time machine resting in a museum, inside a glass-and-steel case made from the glass and the steel which would have been used to build the time machine, if anyone had gone ahead and built that time machine, which nobody did, because of interference with the past via that same time machine.

(2) If one cannot send matter through time, perhaps one can send signals—information.

But even this violates conservation of energy. Any signal involves energy in some form.

Furthermore, relativity laws state that information cannot travel faster than  $c$ , the velocity of light in a vacuum. A signal traveling back through time travels faster than infinity!

(3) Physical time travel clearly violates any law of motion, as motion always relates to time. This affects conservation of momentum, statements about kinetic energy, and even the law of gravity. *Anybody's* law of gravity.

(4) What about drawing information from the future?

If precognition and prophecy are only very accurate guesswork by the subconscious mind, then no laws are violated. But if precognition really has something to do with time—

I cite the Heisenberg Principle. One cannot observe something without affecting it. If one observes the future, there must be an energy exchange of some kind. But that implies that the future one is observing is *the* future; that it already exists; that information is flowing into the past.

I've demonstrated that this violates relativity and conservation of energy. It also involves a Grandfather Paradox, if information drawn from one future is used to create another. And if the information can't be used to change the future, then what good is it?

What was that about the stock market? (5) Travel into the future is no more difficult than suspended animation and a good, durable time capsule. But you can't go home without traveling into the

past.

**D**oes any of this seem like nitpicking? Sure it is. Are we to regard the laws of relativity and conservation as sacred, never to be broken, nor even bent by exceptions? Heaven forbid.

But time travel violates laws more basic than conservation laws.

Our belief in laws of any kind presupposes a belief in cause and effect. Time travel reverses cause and effect. With a Grandfather Paradox operating, the effect, coming before the cause, may cause the cause never to come into effect, with results which are not even self-consistent.

**C**haracters in time-travel stories often complain that English isn't really built to handle time travel. The tenses get all fouled up. We in the trade call this problem Excedrin Headache number  $\sqrt{-3.14159}$ ...

To show it in action, I'd like to quote from one of my own stories, **BIRD IN THE HAND**. The characters have done catastrophic damage to the past, and are discussing how to repair it.

"Maybe we can go around you."

Svezet hesitated, then plunged in.

"Zeera, try this. Send me back to an hour before the earlier Zeera arrives.

Ford's automobile won't have disappeared yet. I'll duplicate it, duplicate the duplicate, take the reversed duplicate and the original past you in the big extension cage. That leaves you to destroy the duplicate instead of the original. I reappear after you've gone, leave the original automobile for Ford, and come back here with the reversed duplicate. How's that?"

"It sounded great. Would you mind going through it again?"

"Let's see. I go back to—"

**T**his was less of a digression than it seemed. The English language can't handle time travel. We conclude that the ancestors who made our language didn't have minds equipped to handle time travel. Naturally we don't either; for our thinking is too dependent on our language.

As far as I know, no language has tenses equipped to handle time travel. No language on Earth. Yet.

But then, no language was ever equipped to handle lasers, television, or spaceflight until lasers, television, and spaceflight were developed. Then the

words followed.

If time travel were thrust upon us, would we develop a language to handle it?

We'd need a basic past tense, an altered past tense, a potential past tense (might have been), an altered future tense, an excised future tense (for a future that can no longer happen), a home base present tense, a present-of-the-moment tense, an enclosed present tense, (for use while the vehicle is moving through time), a future past tense ("I'll meet you at the bombing of Pearl Harbor in half an hour."), a past future tense ("Just a souvenir I picked up ten million years from now"), and many more. We'd need at least two directions of time flow: sequential personal time, and universal time, with a complete set of tenses for each.

We'd need pronouns to distinguish [you of the past] from [you of the future] and [you of the present]. After all, the three of you might all be sitting around the same table someday.

**M**eanwhile (if, God willing, the word still has meaning), time travel must be considered fantasy. It violates too many of the laws of physics and reason to be thought otherwise.

But it's a form of fantasy superbly suited to games of logic. The temptation to work out a self-consistent set of laws for time travel must be enormous. So many writers have tried it!

Let's look at some of the more popular possibilities:

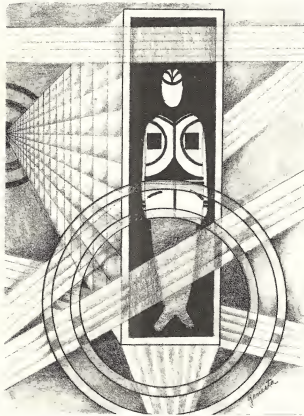
**DEFENSE OF TIME TRAVEL #1:** Assume that (1) One can travel *only* into the future. (2) The universe is cyclic in time, repeating itself over and over.

This works! All you've got to do is go into the future past the Big Collapse when the universe falls in on itself, through the Big Bang when it explodes again, and keep going until you reach the area of the past you're looking for. Then you murder Hitler in 1920, or use the H-bomb on the damyankees at Appomatox, or whatever your daydream is. There is no Grandfather Paradox. You merely get a new future.

True, the next version of *you* will not make the trip. You've eliminated his motive. Thus on the *next* cycle the damyankees will win the Civil War, Hitler will lead Germany into WWII, and so forth. But you've merely introduced a double cycle. There is no paradox.

Further, your time machine need be nothing more than an EXTREMELY dur-

Only with time travel can you  
have the hero and villain each working  
to prevent the other's birth.



able time capsule.

**OBJECTIONS:** Three. First, some people don't believe in cyclic time. (I don't.) Second, locating the proper era is a non-trivial problem when you've got the whole lifetime of the universe to search in. You'd be lucky to find *any* section of human history. Third, removing your time capsule from the reaction of the Big Bang could change the final configuration of matter, giving an entirely different history.

**DEFENSE OF TIME TRAVEL #II:** Known as the theory of multiple time tracks.

Let there be a myriad of realities, of universes. For every decision made by any form of life, let it be made both ways; or in all possible ways if there are more than two choices. Let universes be created with every choice.

Then conservation of matter and energy holds only for the universe of universes. One can move time machines from one universe to another.

You've got to admit it's flamboyant! You still can't visit the past. But you can find a universe where things happened more slowly; where Napoleon is

about to fight Waterloo, or Nero is about to ascend the throne. Or, instead of changing the past, you need only seek out the universe where the past you want is the one that happened. The universe you want unquestionably exists. (Though you may search a long, weary time before you find it.)

Ersatz time travel becomes a special case of sidewise-in-time travel, travel between multiple time tracks.

The *what-if* story has fascinated many writers. Even O. Henry wrote at least one. From our viewpoint, sidewise-in-time travel solves conservation laws, Grandfather Paradox, everything.

I *hate* sidewise-in-time travel stories.

Let me show you why.

First, they're too easy to write. You don't need a brain to write alternate-world stories. You need a good history text.

In the second place . . . did you ever sweat over a decision? Think about one that really gave you trouble, because you knew that what you did would affect you for the rest of your life. Now imagine that for every way you could have jumped, one of you in one universe did

jump that way.

Now don't you feel silly? Sweating over something so trivial, when you were going to take *all* the choices anyway. And if you think that's silly, consider that one of you still can't decide . . .

In the third place, probability doesn't support the theory of alternate time tracks.

There are six ways a die can fall, right? Which makes thirty-six ways that *two* dice can fall, including six ways to get a seven. Each way the dice can fall determines one universe. Then the chance of your ending in each of the thirty-six universes is one in thirty-six, right?

Then it doesn't matter if the dice are loaded. One chance in thirty-six, exactly, is the odds for each way the dice can fall. One chance in six, exactly, of getting a seven.

Experience, however, shows that it *does* matter if the dice are loaded.

**DEFENSE OF TIME TRAVEL #III:** The idea of reversing the flow of time isn't nearly as silly as it sounds. I quote from an article in the October 1969 issue of *Scientific American*, "EXPERIMENTS IN TIME REVERSAL," by Oliver E. Overeth.

"All of us vividly recognise the way time flows; we take considerable comfort, for example, in our confidence that the carefully arranged marriage of gin and vermouth is not going to be suddenly annulled in our glass, leaving us with two layers of warm liquid and a lump of ice. It is a curious fact, however, that the laws that provide the basis for our understanding of fundamental physical processes (and presumably biological processes as well) do not favor one direction of time's arrow over another. They would represent the world just as well if time were flowing backward instead of forward and martinis were coming apart rather than being created."

Is the universe really invariant under time reversal? Many physicists think not. Overeth and his partner Roth spent almost two years looking for a case in subatomic physics in which invariance under time reversal is not preserved.

They knew exactly what they were looking for. They were watching (via some very direct instruments) the decay of a lambda particle into a proton plus a pi meson. The anomaly would have been a nonzero value for the beta component of the spin of the proton.

The point is that they failed to find what they were looking for. There have been many such experiments in recent years, and none have been successful.

At the subatomic level, one cannot tell whether time is running backward or forward.

Could a determined man reach the past by reversing himself in time and waiting for last year to happen again?

Present theory says that he would reverse both the spin and the charge of every subatomic particle in his body. The charge reversal converts the whole mass to antimatter. BOOM!

Less dramatically, there is conservation of mass/energy. Reverse the direction of travel in time of a human body, and to any physicist it would look like two people have vanished.

Clearly this is illegal. We can't do it that way.

We might more successfully reverse a man's *viewpoint*: send his *mind* backward in time. If there is really no difference between past and future, except in attitude, then it should be possible.

But the traveler risks his memory healing to a *tabula rasa*, a blank slate. When he reaches his target date he might not remember what to do about it.

For there is still entropy: the tendency to disorder in the universe, and the most obvious effect of moving "forward" in time. Entropy is not obvious where few reactions are involved, as in the motion of the planets, or as when a lambda particle breaks down. But the mushroom cloud left by a hydrogen bomb is difficult to return to its metal case. That's entropy.

Any specialist in geriatric medicine knows about entropy.

Let's try something less ambitious.

Suppose we found a clump of particles already moving backward in time. (Exactly what Roth and Overseth and their brethren might find in their experiments, if time-reversal turns out to be valid. Though most expect to find just the opposite.) Now we write messages on that clump. Simple messages. "Blue Ben in the sixth, 4/4/72."

But from our viewpoint, we start by finding a message and end by erasing it! And if it went wrong . . . We find a message: "Blue Ben in the sixth, 4/4/72." We bet on him, and he loses. Now what? Can we unwrite a different message? Or just refuse to erase it at all?

But if it did work, we could make a fortune. And it violates no known physical laws! Practically.

Meanwhile, Roth and Overseth and a number of others are all convinced that there must be exceptions to the symmetry of time. If they find just one, it's all over.

**DEFENSE OF TIME TRAVEL #IV:** The oldest of all, going back to Greek times. Philosophers call it *fatalism* or *determinism*. A fatalist believes that everything that happens is predetermined to the end of time; that any attempt to change the predetermined future is fated, is a part of the predetermined future itself.

To a fatalist, the future looks exactly like the traditional picture of the past. Both are rigid, inflexible. The introduction of time travel would not alter the picture at all, for any attempt on the part of a time traveler to change the past has already been made, and is a part of the past.

Fatalism has been the basis for many a tale of a frantic time traveler caught in a web of circumstance such that every move he makes acts to bring about just the calamity he is trying to avert. The standard plot sketch is reminiscent of *Oedipus Rex*; when well done it has the same flavor of man heroically battling Fate—and losing.

Notice how fatalism solves the Grandfather Paradox. You can't kill your grandfather, because you *didn't*. You'll kill the wrong man if you try it; or your gun won't fire.

Fatalism ruins the wish-fulfillment aspect of time travel. Anything that averts the Grandfather Paradox will do that. The Grandfather Paradox is the wish-fulfillment aspect. *Make it didn't happen.*

**T**he way to get the most fun out of time travel is to accept it for what it is. Give up relativity and the conservation laws. Allow changes in the past and present and future, reversals in the order of cause and effect, effects whose cause never happens . . .

*Fatalistic* time travel also allows these causative loops, but they are always simple, closed loops with no missing parts. The appearance of a time machine somewhere always implies its disappearance somewhere-and-somewhere else. But with this new, *free will* kind of time travel . . .

We assume that there is only one reality, one past and one future; but that it can be changed at will via the time machine. Cause and effect may loop toward the past; and sometimes a loop is pinched off, to vanish from the time stream. The traveler who kills his six-year-old grandfather eliminates the cause of *himself*, but he and his time machine remain—until someone else changes the past even further back.

**B**etween the deterministic and free will modes of time travel lies a kind of compromise position:

We assume a kind of inertia, or hysteresis effect, or special conservation law for time travel. The past resists change. Breaks in time tend to heal. Kill Charlemagne and someone will take his place, conquer his empire, mate with his wives, breed sons very like his. Changes will be minor and local.

Fritz Leiber used Conservation of Events to good effect in the Change War stories. In **TRY AND CHANGE THE PAST**, his protagonist went to enormous lengths to prevent a bullet from smashing through a man's head. He was sincere. It was his own head. In the end he succeeded—and watched a bullet-sized meteorite smash into his alter-self's forehead.

Probabilities change to protect history. This is the safest form of time travel in that respect. But one does have to remember that the odds have changed.

Try to save Jesus with a submachine gun, and the gun will *positively* jam.

But if you did succeed in killing your own six-year-old grandfather, you would stand a good chance of taking his place. Conservation of Events requires someone to take his place; and everyone else is busy filling his own role. Except *you*, an extraneous figure from another time. Now Conservation of Events acts to protect you in your new role!

Besides, you're already carrying the old man's genes. . . .

Certain kinds of time travel may be possible; but changing the past is not. I can prove it.

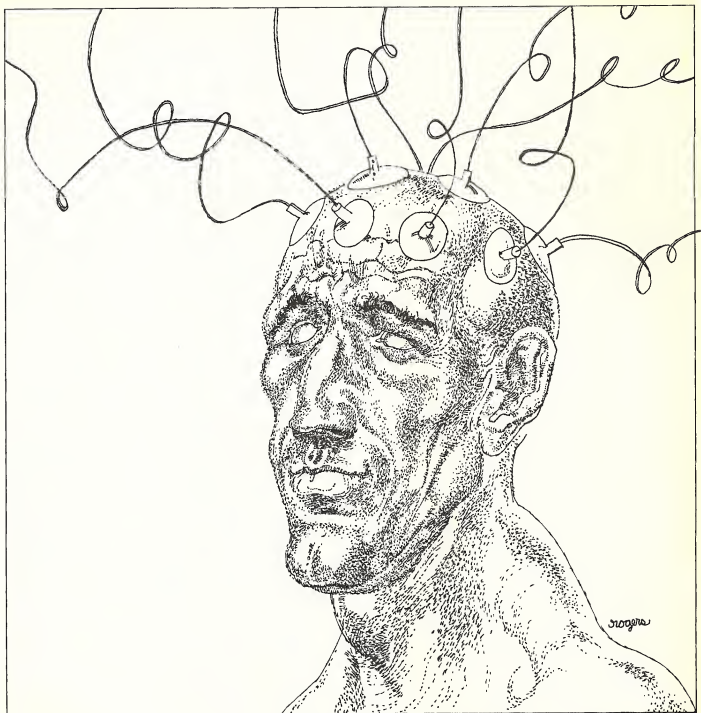
**GIVEN:** That the universe of discourse permits both time travel and the changing of the past.

**THEN:** A time machine will not be invented in that universe.

For, if a time machine is invented in that universe, somebody will change the past of that universe. There is just too much future subsequent to the invention of a time machine: too many people with too many good motives for meddling with too many events occurring in too much of the past.

If we assume that there is no historical inertia, no Conservation of Events, then each change makes a whole new universe. Every trip into the past means that all the dice have to be thrown over again. Every least change changes all the history books, until by chance and endless change we reach a universe where there is no time machine invented, ever, by

(turn to page 89)



# KESSLER

He who lives in other minds should not think rocky thoughts.

fiction/Herman Wrede



I crouched on a cushion of pine needles, watching the path Kessler had to take. A twig snapped and my hand tightened on the rifle stock. He was too intent on the trail I had left to see me.

As he lumbered past my hiding place, I called softly: "Here, Kessler." He whirled in panic, trying to aim his rifle. I pumped two slugs into his great belly.

He floated face down at the bottom of the cove but could see Kessler out of the corner of my eye. He was sinking toward me with a knife in his hand. Even in the water he lacked grace, looking like an evil toad.

When he was two yards above me, I

rolled suddenly and fired my speargun. The spear impaled his leg and his face exploded in pain behind his mask. I made it to the float just as the first shark hit him.

It was hard to keep a straight face as I pretended not to see Kessler stalking me through the ghost town. I stopped to light a cigarette and he threw himself into a doorway.

As I reached the edge of town, where the desert began, he laughed in maniacal glee. "Evans! Turn around and take it!"

He walked toward me, as I waited, with his revolver extended at arm's length. When he was five feet from me

he leered and pulled the trigger. It clicked and his eyes widened, looking like two bad oysters. He pulled the trigger again and again as I reached leisurely toward my holster.

"You should have checked it before you left camp," I said. "I unloaded it this morning." He screamed as the first bullet tore into his face.

**W**e were kids again, back at Sherman School, and Kessler was trying to persuade the umpire he had tagged me for the out. When he realized he wasn't convincing anyone he threw his miff into my face. I picked up the bat and swung it like an axe at the spiky hair that covered his round head.



**K**essler crept with all the stealth of a drunken spider toward my bedroll at the crest of the ridge. He half-buried his knife in it with the first blow but he struck again and again.

He threw back my blanket and the look of shock on his face when he saw it was stuffed with clothing made me laugh aloud from the rock just above his head. As he looked up I placed my boot in his face and shoved. He screamed once as he disappeared over the edge of the ridge.

**H**e was puffing along on the dance floor with Alice when I tapped him on the shoulder. She disengaged herself with a mocking smile and took my arm.

"What is this?" he roared. "You're with me." I winked at him and he mouthed an obscenity before throwing a long punch at me. I caught his arm and tripped him at the same time. His arm broke with a sickening snap and Alice's laugh tinkled merrily.

**M**r. Evans—Mr. Evans; are you all right?" I opened my eyes to see Doctor Green peering anxiously down at me. "Are you all right?" he repeated as he disconnected the electrodes from my helmet.

"I feel like a million bucks, Doc. Are you getting what you need?" He frowned and got stuffy again. "You are paid too well to ask questions." I felt too good

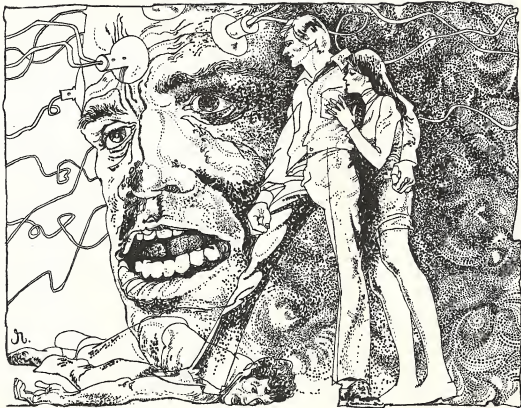
to care.

I watched him as he went to the next table, identical to mine except for the red switch where mine was green. I grinned as he read the gauges on Kessler's helmet. Kessler's eyes were dull for a long time, but they focused into two hot points of hatred when he saw me.

"How's it going, old pal?" I asked. "How did you like that little embellishment about Alice?" He didn't answer for a long time, but he finally nodded and smiled. "I have to admit that was original, but you know something?"

I suddenly felt sick and he sensed it and smiled before he spoke.

"It's my turn tomorrow when we switch tables, Evans; my turn tomorrow." O



Living in the minds  
of others presupposes that  
others will also  
be living in your mind—  
and sometimes dying!

the most contro  
written by

harlan

**bleeding stones**

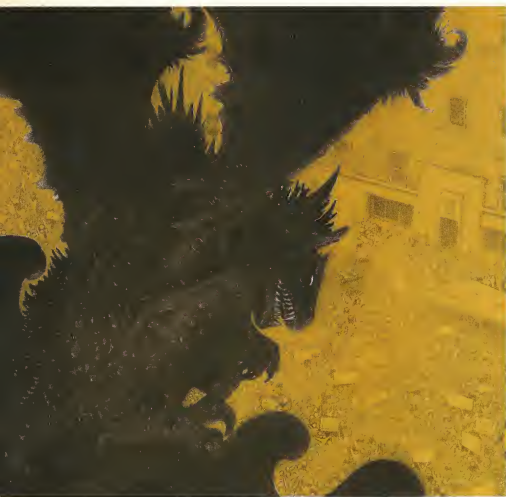


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ersial story ever

ellison

What strange alchemy  
might be at work in our  
polluted atmosphere?  
What will inherit an  
Earth no longer fit for  
human life?



**A**lchemy high above the crowds. Over one hundred years of the Industrial Revolution had spewed chemical magic into the air. The aerosols known as smog. Coal and petroleum fractions containing sulfur, their combustion producing sulfur dioxide, oxidized by atmospheric oxygen to form sulfur trioxide, hydrated by water vapor in the air to sulfuric acid. Alchemical magic that weathers limestone. Particles of soot, particles of ash. Unburned hydrocarbons. Oxides of nitrogen. The magic of ultraviolet radiation, photochemical reactions, photochemical smog: it magically cracks rubber. Unsaturated hydrocarbons, ozone, nitrogen dioxide, formaldehyde, acetone. Magic. Carbon monoxide, carcinogenic hydrocarbons, days and nights of thermal inversion in the atmosphere. Carbon particles, me-

tallic dusts, silicates, fluorides, resins, tars, pollen, fungi, solid oxides, aromatics, even the smells of magic. Catalysts. Carriers of electrostatic charges. *To the extent that they are radioactive,* says page 184 of volume 18 of the 1972 *Encyclopaedia Britannica*, *they increase the normal radiation dosage and may be cancer- or mutation-producing factors.*

Finally, it goes on, *as plain dust, they soil clothing, buildings, and bodies, and are a general nuisance.*

Alchemical magical nuisance, high above the crowds.

Jammed, thronged, packed, overspilling, flowing and shuddering . . . forty thousand people drawn like iron filings to the magnet of St. Patrick's Cathedral, filling the sidewalks and overflowing into Fifth Avenue . . . the mass bulging outward, human yeast, filling the inter-

sections of 51st Street and Fifth Avenue, 50th and Fifth, 52nd and Fifth . . . rolling to find space along the sidewalks and doorways and garden walks of Rockefeller Center. . . .

Hallelujah! The Jesus People have come to the holy summit of organized religion in the land that is the very apotheosis of the Industrial Revolution. St. Patrick's Cathedral, built between 1858 and 1879, puffed out mightily like the pigeons roosting there for over one hundred years as the magic took its time performing its alchemical wonders, the nuisances of cracking rubber, weathering stone, pitting metal, mutating and inverting thermals. Hallelujah!

They are recognized. The Jesus People. One way, united in the worship of Jesus Christ, the Savior, the Son of God; here, at last, at this greatest repository of the faith in the land of ultraviolet radiation, they have come to spread their potency at the altar of organized power.

While above them, on the spires of the city and the parapets of St. Patrick's, the nuisance bears fruit and the stones begin to bleed.

The Cardinal steps out through the massive front doors. The Archdiocese in person, recognizing them. They raise index fingers, thousands of index fingers raised in homage to the One Way.

The Cardinal lifts his arms slowly, his gorgeous robes resplendent in the sunlight glancing off a thousand automobiles spewing out alchemical magic; his arms lift and he is a human crucifix for a moment before his arms rise up above his head and he lifts his index fingers. The crowd trills and sighs with joy. They are known!

**T**he Cardinal feels moisture on his left hand and looks up at his flesh emerging from his sleeve. There is a drop of blood running down through the fold of skin between his thumb and index finger. A fat, globular drop of blood that glistens in the magic air. It bulges and runs in a line down his palm. He is alarmed for a moment: has he cut himself? Then a second drop falls and he realizes the blood is dropping from above.

He looks up.

On the tallest spires of St. Patrick's Cathedral there is movement.

For over one hundred years the stones of the Cathedral have been silent, still, solid and unwanting. Now the stones begin to bleed as the gargoyles come to life.

His eyes widen and see only movement . . .



But above, up here where the winds of the city carry alchemical magic, the stone gargoyles tremble, their rock bodies begin to moisten, and blood stands out in humid beads.

The first of the many shudders and its eyes open slowly. Color comes to its stone flesh. Its taloned hands rise from its knees and flex. Corded muscles bunched for a hundred years slide and move. Its belly heaves as it draws in life. Its bat wings twitch and suddenly unfurl. It drinks of the sunlight and the air, drinks deep and sucks the carcinogens deep into its bellows lungs; the nuisance mutation is complete. Come to life after a hundred years is the race that will inherit the Earth; hardly meek, the race made to breathe this new air. The gargoyle throws back its head and its stone fangs catch the sunlight and throw it back brighter than the hides of the vehicles below.

The clarion call blasts against the noonday tumult of the Jesus People. And they fall silent. And they look up. And all around them, on a hundred spires of a hundred skyscrapers the inheritors rise from their crouched positions, their shapes black and firm-edged against the gray and deadly sky.

Then, like the fighting kites of Brazil, they dive into the crowd and begin the ritual slaughter.

The first of the many swoops down in a screaming fall that sends the Jesus People scattering. At the final instant the gray death-kite flattens and sails across the crowd, its talons extended, arms dangling. The razor-nails imbed themselves in a skull and rip backward as its flight carries gargoyle and victim forward. It skims skyward again and great muscled arms throw the limp meat against the walls of a building, the body ripped open from occipital ridge to buttocks, entrails bulging, spilling from the sprung carcass. The body slides down the wall leaving a red fluorescent smear.

Another, with a hundred isinglass-thin lids over its lizard eyes, dives straight down at a young girl wearing a halter top and blue jeans with cloth patches of butterflies, flowers and elaborate crosses appliquéd to the fabric. It extends the extraordinarily long and pencil-thin middle finger of each four-taloned hand, and drives them deep into her eye-sockets. Then, hooking the fingers, it lifts her, shrieking, into the sky. It drops her from twenty storeys.

Two demi-devils with the heads of gryphons and the bodies of hunchbacked dwarves land with simultaneous crashes

on the roof of a Fifth Avenue bus, slash it open with their clawed feet and throw themselves inside. Screams fill the air as the bus fills with bloody pulp. A window is smashed as an old man tries to escape and one of the demi-devils saws his neck across the ragged glass, spraying the street outside with a geyser from the carotid artery. The body continues to kick. The windows of the bus smear and darken over with pulped flesh and viscera. The demi-devils wallow like two babies in a bathtub, drinking and splashing.

**A** gargoyle with a ring of spikes circling its forehead hurtles into a knot of Jesus People fallen to their knees, hysterically singing *Jesus is a Soul Man*. It rips off the arms of a bearded young man and, flailing about, crushes the skulls of the group. One boy tries to crawl away, his head bleeding, and the gargoyle kicks aside bodies to reach him, grabbing him by the heavy silver chain around his neck.

The chain supports a silver crucifix. The gargoyle twists the chain till it sinks into the flesh of the boy's neck. Screaming, the boy tries to struggle erect, clawing at the garrote with both hands, eyes bulging, face darkening to blue-black as the blood gushes from his ears and mouth. The gargoyle flaps its wings, lifts into the air dangling the struggling boy at the end of the silver chain and, swinging him violently, batters the crowd till the body is dismembered.

A gargoyle has ripped the arms from an old woman and peeled the skin and muscle from the bones, sharpening them with its fangs. It charges up the front steps of St. Patrick's Cathedral and impales the Cardinal through the chest and stomach. The Cardinal, spasming in agony, is carried aloft by two other gargoyles who drop him with titters and giggles onto the topmost spire of the Cathedral. He slides down the spire, the point protruding from his stomach, and the gargoyles spin him like the propeller on a child's wind toy.

A gargoyle crouches on a mound of bodies, eating hearts and livers it has ripped from the not-quite-dead casualties. Another sucks the meat off fingers. Another chews eyeballs, savoring the corneal fluid.

A gargoyle has backed a dozen Jesus People and elegant Avenue shoppers into a doorway and jabs at them with bloody talons, taunting them till they howl with dismay. The gargoyle scrapes its talons across the stones of the building till sparks fly . . . and somehow catch

fire as they shower the shrieking victims. The fire washes over them and they run screaming into the fangs and talons of the marauder. They die, smoldering, and pile up in the doorway.

A gargoyle with a belly huge and round flies up and around, crouching and defecating on the hordes as they trample each other, running in all directions to escape the slaughter. The voiding is diarrhetic and rains down in a thick green and brown curtain that splashes in heavy splattering pools and begins eating into cement and asphalt. It is acid; where it strikes human flesh it eats its way through to bone leaving burning edges and smoking pits. Hundreds fall and are crushed by stampeding pedestrians with no exit.

A gargoyle lights atop the bronze statue of Atlas holding the world on his shoulders that dominates the entrance to 630 Fifth Avenue, kicks loose the great bronze globe and sends it hammering into the crowd. Dozens are crushed at the impact and the gargoyle, laughing hysterically, boots it again and again. The globe thunders through the street flattening cars and people, leaving in its wake a trail of twisted bodies and a gutter-wash of blood and pulp that clogs drain basins with human refuse.

Three gargoyles have found a nun. Two have lifted her above their heads and, wrenching her legs apart like a wishbone, they are splitting her in half as the third creature breaks off a bus stop sign and punches the jagged end of the pole up her vagina, shrieking *Regnum dei in vobis est*, the kingdom of God is within you.

The slaughter goes on and on for hours. The screams of the dying rise up to meet the automated chiming of the Cathedral bells. Darkness falls and the hellfire of demon flames and humans used as torches illuminates the expanse of Fifth Avenue.

All through the night it goes on as the gargoyles range out and around, widening their circles of destruction. Nothing can stop them. The weapons of humankind are useless against them. They are intent upon inheriting the Earth all on the first day and night of their birth.

Finally, nothing moves in the city but the creatures that were once stone, and they fly up, circling the stainless steel and glass towers of industrial magic. They look down with the hungry eyes of those who have slept too long and now, rested, seek exercise.

Then, laughing triumphantly, they flap bat-wings and soar upward, flying off toward the east, toward the Vatican.

very small village nearby. I'd be honored if you'd use it."

He accepted the offer graciously and I talked of Sikinos and its history for awhile.

"The very old civilizations interest me the most," Mike said. "Babylon, Assyria, Sumer, Egypt, the valley of the Euphrates. Crete seems like a newcomer to me. Everything was new then. There was everything to invent, to see, to believe. The gods were not parted into Christianity and all the others then. There was a god, a belief for everyone, big and small. It was not God and the Anti-gods. Life was simpler then."

"Also more desperate," I said. "Despotic kings. Disease. Ignorance. Superstition. There was everything to invent, all right, because nothing much had been invented."

"You're confusing technology with progress. They had clean air, new lands, freshness. The world wasn't used up then."

"You're a pioneer, Mike," I said. "You're working in a totally new medium."

He laughed and took a gulp of wine. "Not really. All art began as science and all science began as art. The engineers were using the sensatrons before the artists. Before that there were a dozen lines of thought and invention that crossed at one point to become sensatrons. The sensatrons just happen to be a better medium to say certain things. To say other things a pen drawing or a poem or a motion picture might be best. Or even not to say it at all."

I laughed and said, "The artist doesn't see things, he sees himself."

Mike smiled and stared for a long time at the columned structure on the hill. "Yes, he certainly does," he said softly.

"Is that why you do women so well?" I asked. "Do you see in them what you want to see, those facets of 'you' that interest you?"

He turned his shaggy dark head and looked at me. "I thought you were some kind of big businessman, Brian. You sound like an artist to me."

"I am. Both. A businessman with a talent for money and an artist with no talent at all."

"There are a lot of artists without talent. They use persistence instead."

"I often wish they wouldn't," I grumbled. "Everyone thinks he's an artist. If I have any talent at all, it'd be to realize I have none. However, I am a first class appreciator. That's why I want you to do a cube of my friend."

"Persistence, see?" He laughed. "I'm

going to do a very erotic nude while I'm on Sikinos. Afterwards, perhaps, I'll want to do something more calmly. Perhaps then I'll do your friend, if she interests me."

"She might not be so calming. She's ... an original."

We left it at that and I told him to contact my office in Athens when he was ready to go to the island and that they would arrange everything.

I found out later, almost by accident, from a friend, that Mike had been "drafted" temporarily to work on something called the Guardian Project. I put in a vidcall and found a wall of red tape and security preventing me from talking to him on Station Three, the space medicine research satellite. Luckily, I knew a bluesy general who shared my passion for Eskimo sculpture and old Louis L'Amour westerns. He set it up and I caught Mike coming off duty.

"What do they have you doing, a portrait of the commanding honcho?"

He smiled wearily and slumped on the bunk, kicking the pickup around with his foot to put himself within range. "Nothin that easy. Guardian is Skyshield all over again, only on priority *una*. They rotated everyone out of here for observation and brought in fresh blood. They seemed to think I could help." He looked tired and distracted.

"Anything I can do? Want me to see if I can get you out of there? I know a few people."

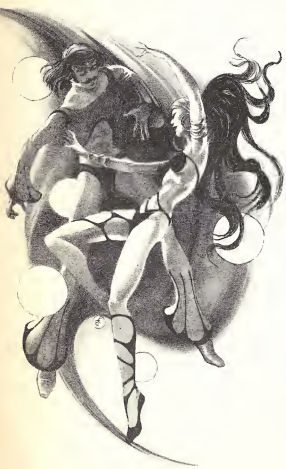
He shook his head. "No. Thank you, though. They gave me the choice of an out-and-out priority draft or a contract. I just want to get it over with and back to living my way." He stared at the papers in his hand with unseeing eyes.

"Is it the low energy particles that's giving them the trouble?"

He nodded. "Exposure over a long period of time is the problem. There's a sudden metabolic shift that's disastrous. Unless we can lick it it will limit the time man can be in space." He held up a thumb-size node. "I think this might do it, but I'm not certain. It's the prototype of a Full Scale Molecular System I designed."

"Can you get a patent?" I asked automatically.

He shook his head and scratched his face with the node. "Anything I design is theirs. It's in the contract. You see, the trouble isn't in this FMS unit, but in the damned sensing and control systems. First you gotta find the particles, then you gotta get their attention. Christ, if I could just shunt them into subspace and get rid of them, I'd ... " His voice



**"Overhead a lattice-work supported  
a swimming pool filled with nude and  
semi-nude swimmers."**

---

trailed off and he stared at the bulkhead.

After a moment or two he shook himself and grinned at me. "Sorry. Listen, let me give you a call later on. I just had an idea."

"Artistic inspiration?" I grinned.

"Huh? Yeah, I suppose so. Excuse me, huh?"

"Sure." He slapped the control and I was staring at static. I didn't see him again for five months, then I took his call patched through from the Sahara base to my Peking hotel. He said he couldn't talk about the Guardian Project but he was free to take me up on the Sikinos offer, if it was still open. I sent him straight up to the island and two more months went by before anything more was heard. I received a pen drawing from him of the view from the terrace at the villa, with a nude girl sunbathing. Then in late August I took a call from him at my General Anomaly office.

"I finished the cube on Sophia. I'm in Athens. Where are you? Your office was very secretive and insisted on patching me through to you."

"That's their job. Part of my job is not letting certain people know where I am or what I'm doing. But I'm in New York. I'm going to Bombay Tuesday, but I could stop off there. I'm anxious to see the new cube. Who's Sophia?"

"A girl. She's gone now."

"Is that good or bad?"

"Neither. I'm at Nikki's, so come on over. I'd like your opinion on the new one."

I felt suddenly proud. "Tuesday at Nikki's. Give her and Barry my love."

I hung up and punched for Madelon. Beautiful Madelon. Rich Madelon. Famous Madelon. Madelon of the superlatives. Madelon the Elusive. Madelon the Illusion.

I saw her at nineteen, slim yet voluptuous, standing at the center of a semicircle of admiring men at a boring party in San Francisco. I wanted her, instantly, with that "shock of recognition" they talk about.

She looked at me between the shoulders of a communications executive and a fossil fuels magnate. Her gaze was steady and her face quiet. I felt faintly foolish just staring and many of the automatic reflexes that rich men develop to save themselves money and heartbreak went into action. I started to turn away and she smiled.

I stopped, still looking at her, and she excused herself from the man speaking to her and leaned forward. "Are you going now?" she asked.

I nodded, slightly confused. With great charm she excused herself from the reluctant semicircle and came over to me. "I'm ready," she said in that calm, certain way she had. I smiled, my protective circuits all activated and alert, but my ego was touched.

We went into the glass elevator that dropped down the outside of the Fairmont Tower Complex and looked out at the fog coming over the hills near Twin Peaks and flowing down into the city.

"Where are we going?" she asked.

"Where would you like to go?" I had met a thousand women that attached themselves to me with all the apparently natural lust, delight, and casualness possible between a poor girl and a rich man. Some had been bold, some subtle, some as subtle as it was possible for them to be. A few had frankly offered business arrangements. I had accepted some of each, in my time. But this one . . . this one was either different or more subtle than most.

"You expect me to say 'Wherever you are going,' don't you?" she said with a smile.

"Yes. One way or another." We left the elevator and went into the guarded garage directly. Entering your car on a public street is sometimes dangerous for a rich man.

"Well, where are we going?" She smiled at me as Bowie held the door open for us. The door clicked shut behind us like the safe door it nearly was.

"I had been contemplating two choices. My hotel and work on some papers . . . or Earth, Fire, Air and Water."

"Let's do both. I've never been to either place."

I picked up the intercom. "Bowie, take us to Earth, Fire, Air and Water."

"Yes; I'll report it to Control."

The girl laughed and said, "Is someone watching you?"

"Yes, my local Control. They must know where I am, even if I don't want to be found. It's the penalty for having businesses in different time zones. By the way, are we using names?"

"Sure, why not?" she smiled. "You are Brian Thorne and I am Madelon Morgana. You're rich and I'm poor."

I looked her over, from the casually tossed hair to the fragile sandals. "No . . . I think you might be without money, but you are not poor."

"Thank you, sir," she said. San Francisco rolled by and Bowie blanked out the windows as we approached a small street riot, then turned off towards the

waterfront. When it was safe, he brought the cityscape back to us as we rolled down a hill and up another.

When we arrived at Earth, Fire, Air and Water, Bowie called me back apologetically as I was going through the door. I told Madelon to wait and went back to get the report on the interphone. When I joined Madelon inside she smiled at me and asked, "How was my report?"

When I looked innocent she laughed. "If Bowie didn't have a dossier on me from your Control or whatever it is I'd be very much surprised. Tell me, am I a dangerous type, an anarchist or a blaster or something?"

I smiled, for I like perceptive people. "It says you are the illegitimate daughter of Madame Chiang Kai-Shek and Johnny Potseed with convictions for mopey, drudgery and penury."

"What's mopey?"

"I haven't the faintest. My omniscient staff tells me you are nineteen, a hick kid from Montana and a half-orphan who worked for eleven months in Great Falls in an office of the Blackfoot National Enterprises."

Her eyes got big and she gasped.

"Found out at last! My desperate secrets revealed!" She took my arm and tugged me into the elevator that would drop us down to the cavern below. She looked up at me with big innocent eyes as we stood in the packed elevator. "Gee, Mr. Thorne, when I agreed to baby-sit for you and Mrs. Thorne I never knew you'd be taking me out."

I turned my head slowly and looked at her with a granite face, ignoring the curious and the grinning. "The next time I catch you indulging in mopey with my Afghan I'm going to leave you home."

Her eyes got all wet and sad. "No, please, I promise to be good. You can whip me again when we get home."

I raised my eyebrows. "No, I think wearing the collar will be enough." The door opened. "Come, my dear. Excuse me, please."

"Yes, master," she said humbly.

The Earth part of the club was the raw ground under one of the many San Francisco hills, sprayed with a structural plastic so that it looked just like a raw-dug cave, yet quite strong. We went down the curving passage toward the maelstrom of noise that was a famous *quiver* group and came out into the huge hemispherical cave. Overhead, a lattice-work of concrete supported a transparent swimming pool filled with nude and semi-nude swimmers. Some were guests

**"Some have said that  
Madelon Morgana was a bitch, a Circe, a witch,  
a fortune-hunter, a corrupter."**

and some were professional entertainers.

There was a waterfall at one end and torches burned in holders in the wall, while a flickering firelight was projected over everything. The *quiver* group blasted forth from a rough cave hacked into the dirt walls halfway up to the overhead swimming pool.

As I took her arm to guide her into the *quivering* mob on the dance floor I said, "You know there is no Mrs. Thorne."

She smiled at me with a serene confidence. "That's right."

The night swirled around us. Winds blew in, scented and warm, then cool and brisk. People crashed into the water over us with galaxies of bubbles around them. One *quiver* group gave way to another, tawny animals in pseudo-lion skins and shaggy hairs, the women bare-breasted and wanton.

Madelon was a hundred women in a hundred minutes, but seemingly without effort. They were all her, from sullen siren to goshwowing teenie. I confess to a helpless infatuation and cared not if she was laying a trap for me or not.

The elemental decor was a stimulant and I felt younger than I had in years. People joined us, laughed and drank and tripped, and left, and others came. Madelon was a magnet, attracting joy and delight, and I was very proud.

We came to the surface at dawn and I triggered a tagalong for Bowie. We drove out to watch sunup over the Bay, then went to my hotel. In the elevator I said, "I'll have to make that up to Bowie, I don't often stay out like that."

"Oh?" Her face was impish, then softened and we kissed outside my door. She began undressing as we entered, with great naturalness, and laughingly pulled me into the shower even as I was learning the beauty of her lithe young figure. We soaped and slid our bodies over one another and I felt younger and more alive than I had in godknobs.

We made love and music played. Outside, the city awakened and began its business. What can you say about two people making love for the first time? Sometimes it is a disaster, for neither of you know the other, and that disaster colors the subsequent events. But sometimes it is exciting and new and wonderful and satisfying, making you want to do it again and again.

It changed my life.

I took her to Triton, the bubble city beneath the Mediterranean near Malta, where we marveled at the organic gill research and watched the plankton sweepersubbs docking. We donned ar-

tificial membrane gills and dived among the rocks and fish to great depths. Her hair streamed behind her like a mermaid, and we dipped and rose with a school of swift lantern-fish. We "discovered" the crusted remains of a Phoenician war galley and made love at twenty fathoms.

We visited Naxos, where Dionysus found Ariadne asleep on the shore, deserted by Theseus, and where I found Madelon, naked and gleaming, playing in a tidepool. At Kos, the birthplace of Hippocrates, Hilary gave a great party at her villa, and we "premiered" a tape by Thea Simon, and ate fruit on the terrace and watched the ships go into space from Sahara Base.

We flew to San Salvador and rode through the tall grasses on my cattle ranch there, and made love by a stream. We dove off the Great Barrier Reef in the ecology preserve, and walked on the beach at Bora Bora at sunset, talking of our childhoods. We saw the temple dancers at Angkor Wat and felt how very old man was, and how young. We went to a party at Li Wing's, in Nanking, where Madelon seemed childishly pleased that I turned down the offer of three gorgeous raven-haired beauties for a night with her.

The world was a playground, a beautiful toy. We could deplore the harsh, but necessary, methods they were using to reduce the population in India, even as we flew high overhead to Paris, for Andre's *fête*, where the most beautiful women in Europe appeared in sculptured body jewelry and little else.

I took her to the digs at Ur in the hot, dusty Euphrates Valley, but stayed in an airconditioned mobilevilla. We sailed the Indian Ocean with Karpolis even as the Bombay riots were killing hundreds of thousands. The rest of the world seemed far away, and I really didn't care much, for I was gorging at a love-feast. My man Benedict handled the routine matters and I put almost everything else off for awhile.

We went up to Station One and "danced" in the null-gravity of the so-called "Star Ballroom" in the big can of the central hub. We took the shuttle to the moon, for Madelon's first visit. I saw Tycho Base with fresh eyes and a sense of adventure and wonder which she generated. We went on up to Copernicus Dome then around to the new Young Observatory on Backside. We looked at the stars together, seeing them so clearly, so close and unblinking. I ached to go all the way out and so did she. Bundled into bulky suits we took a walk on the surface, slightly annoyed

to be discreetly watched over by a Lunar Tour guide, there to see that the green-horns didn't muck up.

We loved every minute of it. We lay spoon-fashion in our bed at night and talked of the stars and alien life and made lovers' plans for the future.

I was in love. I was blind, raw, sensitive, happy, insane, and madly foolish. I spent an emotional treasure and counted it well-used.

I was indeed in love.

But love cannot stifle, nor can it be bought, not even with love. Love can only be a gift, freely given, freely taken. I used my money as a tool, as Cilento might use a scan pattern, to give us time and pleasure, not to "buy" Madelon.

All these trips cost a fortune, but it was one of the reasons I had money. I could have stopped working at making it long before, except I knew I would seriously drain my capital with commissions and projects and joy rides and women. I was already starting to think of going to Mars with Madelon, but it was a seven month trip one-way and that was a big chunk of time to carve from my schedule.

Instead, I introduced her to my world. There were the obvious, public events, the concerts and exhibitions and parties. She shared my enthusiasm in finding and assisting young artists in every field, from the dirt-poor Mexican peasant with a natural talent for clay sculpture to the hairy, slay Slaw with the house full of extraordinary synthecizor tapes, that few had heard.

There was the private world, the "secrete" houses in various parts of the globe, the private beaches and fast cars, the worthy friends, like Turner, the senator, and Dunn, the percussionist; like Barbara and Carol and Greg and the others. She had gowns by Queen Kong, in Shanghai, and custom powerjewels by Simpson. She had everything she wanted, which was probably my first mistake.

Some have said that Madelon Morgana was a bitch, a Circe, a witch, a fortune-hunter, a corrupter. Some have said that she was misunderstood, an angel, a saint, a creature much sinned against. I knew her very well and she was probably all those things, at various times and places. I was the first, last and only legal husband of Madelon Morgana.

I wanted her and I got her. Getting a woman I wanted was not all that difficult. Standing on my money and fame I was very tall. Sometimes I wonder

**"Some have said that she was  
misunderstood, an angel, a saint, a creature  
much sinned against."**

how well I might do as a lover without money, but I was too lazy to try.

I wanted Madelon because she was the most beautiful woman I had ever seen, and the least boring. Sooner or later all women bored me, and most men. When there are no surprises even the most attractive people grow stale. Madelon may have aroused a great variety of emotions in me, from love to hate, at times, but she never bored me and boredom is the greatest sin. Even those that *work* at not being boring can become boring because their efforts show.

But Madelon was beautiful inside as well as out and I had had my fill of beautiful flesh and gargoyle minds.

It wasn't so much that I "got" Madelon as that I married her. I attracted her, our sex life was outstanding, and my wealth was exactly the convenience she needed. My money was *her* freedom.

No one owned Madelon, not even I. Her other lovers were infrequent, but quite real. I never kept count, though I knew Control could retrieve the data from the surveillance section's computers. It was not that I had her watched, but that she must be watched for her own protection. It is all part of being rich and how better to extract a few million from me than by the ancient and dishonorable means of kidnapping. Guarding against an assassin was almost impossible, if the man was intelligent and determined, but the watch teams gave me comfort when she was not close. Meanwhile, I studied *mazeru* with Shigeta, when I could. Your own reflexes are your best protection.

In four years Madelon had only two lovers that I thought were beneath her. One was a rough miner who had struck it big in the Martian mines near Bradbury and was expending a certain animal vitality along with his new wealth. The second was a tape star, quite charming and beautiful, but essentially hollow. They were momentary liaisons and when she perceived that I was distressed she broke off immediately, something that both men could not understand.

But Madelon and I were friends, as well as man and wife, and one is not knowingly rude to friends. I frequently insult people, but I am never rude to them. Madelon's taste was excellent, and these other relationships were usually fruitful in learning and joy, so that the two that were distasteful to me were very much in the minority.

Michael Cileto was different.

I talked to Madelon and then flew to see Mike at Nikki's. Our meeting was warm. "I can't thank you enough for the

villa," he said, hugging me. "It was so beautiful and Nikos and Maria were so very nice to me. I did some drawings of their daughter. But the island—ah! Beautiful . . . very peaceful, yet . . . exciting, somehow."

"Where's the new cube?"

"At the Athena Gallery. They're having a one-man, one-cube show."

"Well, let's go. I'm anxious to see it."

I turned to my man Stamos. "Madelon will be along soon. Please meet her and take her directly to the Athena." To Mike I said, "Come—I'm excited."

The cube was life-size, as were all of Mike's works. Sophia was olive-skinned and full-breasted, lying on a couch covered with deep fur, curled like a cat, yet fully displayed. There was a richness in the work, an opulence reminiscent of Matisse's odalisques. But the sheer animal eroticism of the girl overpowered everything.

She was the Earth Mother, Eve and Lilith together. She was the pagan prin-



cess, the high priestess of Ba'al, the great whore of Babylon. She was nude, but a sun ornament gleamed dully between her breasts. Beyond her, through an arch of ancient, worn stone, was a dawn world, lush and green beyond a high wall. There was a feeling of time here, a setting far back beyond recorded history, when myths were men and monsters perhaps real.

She lounged on animal furs, with the faint suggestion of a wanton sprawl, with no part of her hidden, and a half-eaten apple in her hand. The direct suggestion of Eve would have been ludicrous, except for the sheer raw power of the piece. Suddenly the symbolism of the Biblical Eve and her apple of knowledge had a



**"Michael Cilento had something extra,  
the art, the drive, the vision, the talent  
that could make him a Legend."**

reality, a meaning.

Here, somewhere in Man's past, Michael Cilento seemed to be saying, there was a turning. From simplicity toward complexity, from innocence to knowledge and beyond, perhaps to wisdom. And always the intimate personal secret lusts of the body.

All this in one cube, from one face. I walked to the side. The girl did not change, except that I was now looking at her side, but the view through the arch had changed. It was the sea, stretching under heavy clouds to the unchanging horizon. The waves rolled in, oily and almost silent.

The back view was past the voluptuous girl toward what she looked at: a dim room, a corridor leading to it, lit with flickering torches, going back into darkness... into time? Forward into time? The Earth Mother was waiting.

The fourth side was a solid stone wall beyond the waiting woman and on the wall was set a ring and from the ring hung a chain. Symbol? Decoration? But Mike was too much an artist to have something without meaning in his work, for decoration was just design without content.

I turned to Mike to speak, but he was looking at the door.

Madelon stood in the entrance, looking at the cube. Slowly she walked toward it, her eyes intent, secret, searching. I said nothing, but stepped aside. I glanced at Mike and my heart twisted. He was staring at her as intently as she looked at the sensatron cube.

As Madelon walked closer, Mike stepped near me. "Is this your friend?" he asked. I nodded. "I'll do that cube you wanted," he said softly.

We waited silently as Madelon walked slowly around the cube. I could see she was excited. She was tanned and fit, fresh from a submarine exploration of the Aegean with Markos. At last she turned away from the cube and came directly to me with a swirl of her skirt. We kissed and held each other a long time.

We looked into each other's eyes for a long time. "You're well?" I asked her. "Yes." She looked at me a long moment more, a soft smile on her face, searching my eyes for any hurt she might have caused. In that shorthand, intimate language of old friends and old lovers she questioned me with her look.

"I'm fine," I said, and meant it. I was always her friend but not so often her lover. But I still had more than most men, and I do not mean my millions. I had her love and respect, while others

had usually just her interest.

She turned to Mike with a smile. "You are Michael Cilento. Would you do my portrait, or use me as a subject?" She was perceptive enough to know that there was a more than subtle difference.

"Brian has already spoken to me about it," he said.

"And?" She was not surprised.

"I always need to spend some time with my subject before I can do a cube." Except with the Buddha cube, I thought with a smile.

"Whatever you need," Madelon said. Mike looked past her at me and raised his eyebrows. I made a gesture of acquiescence. Whatever was needed. I flatter myself that I understand the creative process better than most non-artists. What was needed was needed; what was not needed was unimportant. With Mike, technology had ceased to be anything but a minimal hindrance between him and his art. Now he needed only intimacy and understanding of what he intended to do. And that meant time.

"Use the Transjet," I said. "Blake Mason has finished the house on Malagasy. Use that. Or roam around awhile."

Mike smiled at me. "How many homes do you have, anyway?"

"I like to change environments. It makes life more interesting. And as much as I try to keep my face out of the news it keeps creeping in and I can't be myself in as many places as I'd like."

Mike shrugged. "I thought a little fame would be helpful, and it has, but I know what you mean. After the interviews on *Artworld* and the Jimmy Brand show I can't seem to go anywhere without someone recognizing me."

"The bitter with the sweet," I said.

"Brian uses a number of personnas as well," Madelon said. Mike raised his eyebrows. "The secret lives of Brian Thorne, complete with passports and uncards," she laughed.

Mike looked at me and I explained. "It's necessary when you are the center of a power structure. There are times you need to Get Away From It All, or to simply not be you for awhile. It's much like an artist changing styles. The Malagasy house belongs to 'Ben Ford' of Publiux... I haven't been there yet, so you be Ben."

**P**eople have said that I asked for it. But you cannot stop the tide; it comes in when it wants and it goes when it wants. Madelon was unlike any individual that I had ever known. She owned herself. Few people do. So many are mere reflections of others, mirrors of

fame or power or personality. Many let others do their thinking for them. Some are not really people, but statistics.

But Madelon was unlike the others. She took and gave without regard for very many things, demanding only truth. She was hard on her friends, for even friends sometimes require a touch of non-truth to help them out.

She conformed to my own definition of friendship: friends must interest, amuse, help and protect you. They can do nothing more. To what extent they fulfill these criteria defines the degree of friendship. Without interest there is no communication; without amusement there is no zest; without help and protection there is no trust, no truth, no security, no intimacy. Friendship is a two-way street and Madelon was my friend.

Michael Cilento was also unlike most other people. He was an Original, on his way to being a Legend. At the bottom level there are people who are "interesting" or "different." Those below that should not be allowed to waste your time. On the next step above is Unique. Then the Originals, and finally those rare Legends.

I might flatter myself and say that I was certainly different, possibly even Unique on a good day. Madelon was an undisputed Original. But I sensed that Michael Cilento had that something extra, the art, the drive, the vision, the talent that could make him a Legend. (Or destroy him.)

So they went off together. To Malagasy, off the African coast. To Capri. To New York. Then I heard they were in Algiers. I had my Control keep an extra special eye on them, even more than the usual protective surveillance I kept on Madelon. But I didn't check myself. It was their business.

A videreport had them on Station One, dancing in the null gravity of the big ballroom balloon. Even without Control I was kept abreast of their actions and whereabouts by that host of people who found delight in telling me where my wife and her lover were. And what they were doing. How they looked. What they said. And so forth.

Somehow none of it surprised me. I knew Madelon and what she liked. I knew beautiful women. I knew that Mike's sensatron cubes were passports to immortality for many women.

Mike was not the only artist working in the medium, of course, for Hayworth and Powers were both exhibiting and Coe had already done his great "Family." But it was Mike the women wanted.

**"The new Reformed Church was  
once again involved in art patronage,  
a 2,500-year-old tradition."**

Presidents and kings sought out Cinardo and Lisa Araminta. Vidstars thought Hampton fashionable. But Mike was the first choice for all the great beauties.

I was determined that Mike have the time and privacy to do a sensatron cube of Madelon and I made it mandatory at all my homes, offices, and branches that Mike and Madelon be isolated from the vidhacks and nuts and time wasters as much as possible.

It was the purest ego on my part, that lusting toward a sensatron portrait of Madelon. I suppose I wanted the world to know that she was "mine" as much as she could belong to anyone. I realized that all my commissioning of art was, at the bottom, ego.

Make no mistake—I enjoyed the art I helped make possible, with a few mistakes that kept me alert. But I enjoyed many kinds and levels and degrees of art. I did not go by present popularity but preferred to find and encourage new artists.

You see, I am a businessman. A very rich one, a very talented one, a very famous one, but no one will remember me beyond the memory of my few good friends. I would not even be a footnote in history, except for my association with the arts.

But the art I help create will make me live on. I am not unique in that. Some people endow colleges, or create scholarships or build stadiums. Some build great houses, or even cause laws to be passed. These are not always acts of pure egotism, but the ego often enters into it, I'm certain, and especially if it is tax deductible.

Over the years I have commissioned Vardi to do the Fates for the Terrace Garden of the General Anomaly complex, my financial base and main corporation. I pressed for Darrin to do the Rocky Mountain sculptures for United Motors. I talked Willoughby into doing his golden beast series at my home in Arizona. Caruthers did his "Man" series of cubes because of a commission from my Manpower company. The panels that are now in the Metropolitan were done for my Tahiti estate by Elinor Ellington. I gave the University of Pennsylvania the money to impregnate those hundreds of sandstone slab carvings on Mars and get them safely to Earth. I subsidized Eklundy for five years before he wrote his Martian Symphony. I sponsored the first air music concert at Sydney.

My ego has had a good working out.

I received a tape from Madelon the same day I had a call from the Pope, who wanted me to help him convince

Mike to do his tomb sculptures. The new Reformed Church was once again involved in art patronage, a 2,500-year-old tradition.

But getting a tape from Madelon, instead of a call, where I could reply, hurt me. I half-suspected I had lost Madelon.

My armored layers of sophistication told me glibly that I had asked for it, even had intrigued to achieve it. But my beast-gut told me that I had been a fool. This time I had outsmarted myself.

I dropped the tape in the playback. She was recording from a garden of martian lichen in Trumpet Valley, and the granite boulders behind her were covered with the rust and olive green and glossy black of the alien transplants. I arranged for Ecolco to give Tashura the grant that made the transfer from Mars possible. The subtle, subdued colors seemed a suitable background for her beauty, and her message.

"Brian, he's fantastic. I've never met anyone like him."

I died a little and was sad. Others had amused her, or pleased her lush golden body, or were momentarily mysterious to her, but this time . . . this time I knew it was different.

"He's going to start the cube next week, in Rome. I'm very excited. I'll be in touch." I saw her punch the remote and the tape ended. I put my man Benedict on the trace and found her in the Eternal City, looking radiant.

"How much does he want to do it?"

I asked. Sometimes my businessman's brain likes to keep things orderly and out front, before confusion and misunderstanding sets in. But this time I was abrupt, crass and rather brutal, though my words were delivered in a normal, light tone. But all I had to offer was the wherewithal that could pay for the sensatron cube.

"Nothing," she said. "He's doing it for nothing. Because he wants to, Brian."

"Nonsense. I commissioned him. Cubes cost money to make. He's not that rich."

"He told me to tell you he wants to do it without any money. He's out now, getting new cilli nets."

I felt cheated. I had caused the series of events that would end in the creation of a sensatron portrait of Madelon, but I was going to be cheated of my only contribution, my only connection. I had to salvage something.



**"For a long moment I hated  
Michael Cilento and he was probably  
never so near death."**

"It . . . it should be an extraordinary cube. Would Mike object if I built a structure just for it?"

"I thought you wanted to put it in the new house on Battle Mountain."

"I do, but I thought I might make a special small dome of spratstone. On the point, perhaps. Something extra nice for a Cilento masterpiece."

"It sounds like a shrine." Her face was quiet, her eyes looking into me.

"Yes," I answered slowly, "perhaps it is." Maybe people shouldn't get to know you so well that they can read your mind where you cannot. I changed the subject and we talked for a few minutes of various friends. Steve on the Venus probe, A fashionable *courtier* who was showing a line based on the new Martian tablet finds. A new sculptor working in magnaplastics. Blake Mason's designs for the Gardens of Babylon. A festival in Rio that Jules and Gina had invited us to. The Pope's desire for Mike to do his tomb. In short, all the gossip, trivia, and things of importance between friends.

I talked of everything except what I wanted to talk about.

When we parted Madelon told me with a sad, proud smile that she had never been so happy. I nodded and punched out, then stared sightlessly at the skyline. For a long moment I hated Michael Cilento and he was probably never so near death. But I loved Madelon and she loved Mike, so he must live and be protected. I knew that she loved me, too, but it was and had always been a different kind of love.

I went to a science board meeting at Tycho Base and looked at the green-brown-blue white-streaked Earth "overhead" and only paid minimal attention to the speakers. I came down to a petroleum meeting at Hargessia, in Somalia. I visited a mistress of mine in Samarkand, sold a company, bought an electronics for the Louvre, visited Armand in Nardonne, bought a company, commissioned a concerto from a new composer I liked in Ceylon, and donated an early Caruthers to the Prado.

I came, I went. I thought about Madelon. I thought about Mike. Then I went back to what I did best: making money, making work, getting things done, making time pass.

I had just come from a policy meeting of the North American Continent Ecology Council when Madelon called to say the cube was finished and would be installed in the Battle Mountain house by the end of the week.

"How is it?" I asked.

She smiled. "See for yourself."

"Smug bitch," I grinned.

"It's his best one, Brian. The best sensation in the world."

"I'll see you Saturday." I punched out and took the rest of the day off and had an early dinner with two Swedish blondes and did a little fleshily purging. It did not really help very much.

On Saturday I could see the two tiny figures waving at me from the causeway bridging the house with the tip of the spire of rock where the copter pad was. They were holding hands.

Madelon was tanned, fit, glowing, dressed in white with a necklace of Cartier Tempopoint tattoos across her shoulders and breasts in glowing facets of liquid fire. She waved at Bowie as she came to me, squinting against the dust the copter blades were still swirling about.

Mike was there, dressed in black, looking haunted.

*Getting to you, boy?* I thought. There was a vicious thrill in thinking it and I shamed myself.

Madelon hugged me and we walked together back over the high causeway and directly to the new spray-stone dome in the garden, at the edge of a five hundred foot cliff.

The cube was magnificent. There hadn't been anything like it, ever. Not ever.

It was the largest cube I'd seen. There have been bigger ones since but at the time it was quite large. None have been better. Its impact was stunning.

Madelon sat like a queen on what has come to be known as the Jewel Throne, a great solid throne-like block that seemed to be part temple, part jewel, part dream. It was immensely complex, set with faceted electronic patterns that gave it the effect of a superbly cut jewel that was somehow also liquid. Michael Cilento would have made his place in art history with that throne alone.

But on it sat Madelon. Nude. Her waist long hair fell in a simple cascade. She looked right out at you, sitting erect, almost primly, with an almost triumphant expression.

It drew me from the doorway. Everyone, everything was forgotten, including the original and the creator with me. There was only the cube. The vibrations were getting to me and my pulse increased. Even knowing that pulse generators were working on my alpha waves and broadcast projectors were doing this and the sonics were doing that and my own alpha wave was being synchronized and reprojected did not affect me. Only the

cube affected me. All else was forgotten.

There was just the cube and me, with Madelon in it, more real than the reality.

I walked to stand before it. The cube was slightly raised so that she sat well above the floor, as a queen should. Behind her, beyond the dark violet eyes, beyond the incredible presence of the woman, there was a dark, misty background that may or may not have been moving and changing.

I stood there a long time, just looking, experiencing. "It's incredible," I whispered.

"Walk around it," Madelon said. I felt the note of pride in her voice. I moved to the right and it was as if Madelon followed me with her eyes without moving them, following me by sensing me, alert, alive, ready for me. Already, the electronic image on the multi-layered surfaces was real. Mike's electronic brushes had transformed the straight basic video images in subtle ways, artful shifts and fragile shadings on many levels revealing and emphasizing delicately.

The figure of Madelon sat there, proudly naked, breathing normally with that fantastically lifelike movement possible to the skilled molecular constructors. The figure had none of the flamboyance that Caruthers or Raeburn brought to their figures, so delighted in their ability to bring "life" to their work that they saw nothing else.

But Mike had restraint. He had power in his work, understatement, demanding that the viewer put something of himself into it.

I walked around to the back. Madelon was no longer sitting on the throne. It was empty, and beyond it, stretching to the horizon, was an ocean and above the toppling waves, stars. New constellations glowed. A meteor flashed. I stepped back to the side. The throne was unchanged but Madelon was back. She sat there, a queen, waiting.

I walked around the cube. She was on the other side, waiting, breathing, being. But in back she was gone.

*But to where?*

I looked long into the eyes of the figure in the cube. She stared back at me, into me. I seemed to feel her thoughts. Her face changed, seemed about to smile, grew sad, drew back into queenliness.

I drew back into myself. I went to Mike to congratulate him. "I'm stunned. There are no words."

He seemed relieved at my approval. "It's yours," he said. I nodded. There was nothing to say. It was the greatest

**"In Mike's free hand he is  
holding out to Madelon something glowing.  
A starpoint of energy."**

work of art I knew. It was more than Madelon or the sum of all the Madelons that I knew existed. It was Woman as well as a specific woman. I felt humble in the presence of such great art. It was "mine" only in that I could house it. I could not contain it. It had to belong to the world.

I looked at the two of them. There was something else. I sensed what it was and I died some more. A flicker of hate for both of them flashed across my mind and was gone, leaving only emptiness.

**M**adelon is coming with me," Mike said.

I looked at her. She made a slight nod, looking at me gravely, with deep concern in her eyes. "I'm sorry, Brian."

I nodded, my throat constricted suddenly. It was almost a business deal: the greatest work of art for Madelon, even trade. I turned back to look at the sensation again and this time the image-Madelon seemed sad, yet compassionate. My eyes were wet and the cube shimmered. I heard them leave and long after the throb of the copter had faded away I stood there, looking into the cube, into Madelon, into myself.

They went to Athens, I heard, then to Russia for awhile. When they went to India so that Mike might do his Holy Men series I called off the discreet monitors Control still had on them. I saw him on a talk show and he seemed withdrawn, and spoke of the pressures fame placed upon him. Madelon was not on the show, nor did he speak of her.

As part of my technology updating I was given an article on Mike, from *Science News*, that spoke of his technical achievements rather than his artistic. It seemed the Full Scale Molecular System was a success and much of the credit was his. The rest of the article was on spinoffs of his basic research.

It all seemed remote from me, but the old habits died hard. My first thought on seeing the new Dolan exhibit was how Madelon would like it. I bought a complete sculptured powerjewel costume from Cartier's before I remembered, and ended up giving it to my companion of a weekend in Mexico City just to get rid of it.

I bought companies. I made things. I commissioned art. I sold companies. I went places. I changed mistresses. I made money. I fought stock control fights. Some I lost. I ruined people. I made others happy and rich. I was alone a lot.

I return often to Battle Mountain. That is where the cube is.

The greatness of it never bores me; it is different each time I see it, for I am different each time. But then Madelon never bored me either, unlike all other women, who sooner or later revealed either their shallowness or my inability to find anything deeper.

I look at the work of Michael Cilento and I know that he is an artist of his time, yet like many artists, *not* of his time. He uses the technology of his time, the attitude of an alien, and the same basic subject matter that generations of fascinated artists have used.

Michael Cilento is an artist of women. Many have said he is the artist who caught women as they were, as they wanted to be, and as *he* saw them, all in one work of art.

When I look at my sensation cube, and at all the other Cilentos I have acquired, I am proud to have helped cause the creation of such art. But when I look at the Madelon that is in my favorite cube I sometimes wonder if the trade was worth it.

The cube is more than Madelon or the sum of the sum of all the Madelons who ever existed. But the reality of art is not the reality of reality.

After the showing of the Cilento Retrospective at the Modern the social grapevine told me nothing about them for several months. Reluctantly, I asked Control to check.

The check revealed their occupancy of a studio in London, but enquiries in the neighborhood showed that they had not emerged in over a month and no one answered a knock. I authorized a discreet illegal entry. Within minutes they were back on the satellite line to me in Tokyo.

"You probably should see this yourself, sir," the man said.

"Are they all right?" I asked and it hurt to ask.

"They're not here, sir. Clothes, papers, effects, but no trace."

"You checked with customs? You checked the building?"

"Yes, sir, first thing. No one knows anything, but..."

"Yes?"

"There's something here you should see."

The studio was large, a combination of junk yard, machine shop, mad scientist's laboratory and art gallery, much as every other sensation artist's studio I had ever been in. Later, I was to see the details—the flowerwine bottles painted with gay faces, the tiny sensation cubes that made you happy just to hold them and watch them change, the art

books with new drawings done over the old reproductions, the crates and charts and diagrams.

Later, I would wander through the rubble and litter and museum quality art and see a few primitive daubs on canvas that were undoubtedly Madelon's. I'd find the barbaric jewelry, the laughing triphots, the tapes, the Persian helmet stuck with dead flowers, the painted rock wrapped in aluminum foil setting in the refrigerator, the butterfly in permaplastic, the unfinished sandwich.

But all I saw when I walked in were the cubes.

I bought the building and had certain structural changes made. I didn't want to move one of the cubes a millimeter. The one that all the vidtads and reviewers have called "The Lovers" I took. I couldn't keep it from the world, even though it hurt me to show it.

The other cube was more of a tool, a piece of equipment, rough-finished but complete, not really a work of art, and I didn't want it moved.

Once it was seen people wanted "The Lovers" in a curiously avid way. Museums bid, cajoled, phoned, compromised, regrouped into phalanxes asking for tours, betrayed each other, regrouped to try again.

In a way it's all I have left of them. I pursued the lines of obvious investigation but I found no trace of them, not on Earth, not on the Moon, not on Mars. I ordered Control to stop looking when it became obvious they did not want to be found. Or could be.

But in a way they are still here. Alive. In the Cube.

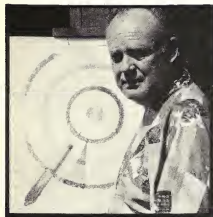
They are standing facing each other. Nude. Looking into each other's eyes, hand in hand. There is rich new grass under their feet and tiny flowers growing. In Mike's free hand he is holding out to Madelon something glowing. A starpoint of energy. A small shining universe. He is offering it to her.

Behind them is the sky. Great beautiful spring clouds move majestically across the blue. Far down, far away are worn ancient rocks, much like Monument Valley in Arizona, or the Crown of Mars, near Burroughs. That's the first side I saw.

I walked around to the right, slowly. They did not change. They still stared into each other's eyes, a slight and knowing smile on their lips. But the background was stars. A wall of stars beyond the grass at their feet. Space. Deep space filled with incredible red dwarfs, monstrous blue giants, ice points

*/Turn to page 88*

# DREAMER OF TOMORROW: ALBERT A. NEUTZELL



**W**hen I learned that the editor of VERTEX was interested in presenting a feature on Albert Neutzell's cover art, I willingly accepted the assignment to provide a bio-sketch on my father.

**A**lbert Augustus Neutzell (the extra "L" used to balance the "N" when signing a painting) was a full-time commercial artist. Unlike many sci-fi artists, who start as fans, breaking into illustrating and cover art in order to work their way into higher paying markets, Dad entered the field later in life, more as a side-line to please me.

The surprising fact is that Dad wasn't a sci-fi buff. He considered the idea of space travel to be the stuff of dreams, fantasy—it would never happen in his life-time, nor mine, nor in a hundred years—if ever! Yet he lived to see man reaching into space.

Albert Neutzell was one of the early artists who had so much influence on science fiction art—bringing fresh new techniques to the field.

article/Charles Neutzel

Art was serious business to Dad.

He believed a person should use his creative abilities to express beauty, offering something to others—not just to artists and a few select "experts"—and make money doing so!

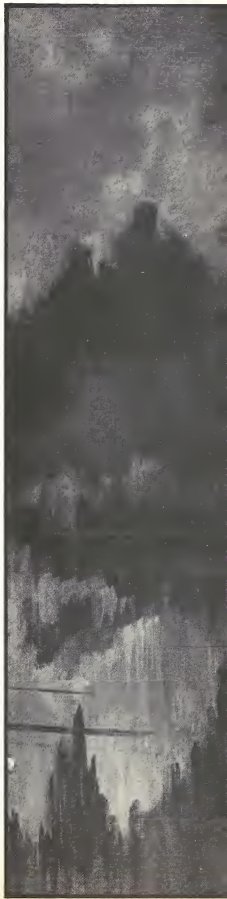
But even committed completely to this concept, he enjoyed painting pictures which people could hang on their walls.

To quote him:

"The highest compliment which can be given a true artist is when a person is willing to pay hard cash in order to own a painting—a creative product—which was formed from colors, brush and canvas out of the feeling and emotions in his own being—mind."

**I**n the beginning years he developed his fine art abilities, while making a living doing commercial art; and only after retirement did most of his efforts go to painting for galleries.

Dad was born in 1901, Jan. 18, and died some 68 years later, mere weeks before Man landed on the Moon. At an early age his family brought him to California, where he spent the rest of his life. While working for his father, as a teenager, Dad went to art school at night, learning the fundamentals of his craft. In Los Angeles, on June 27, 1931, he married Betty Jane Stockberger, daughter of a newspaper editor. A few years later, in San Francisco, they had twin sons, the oldest, named after Dad, dying hours after birth. For years, Dad had been working for Fox West Coast Theaters, in Los Angeles, San Diego and San Francisco. (This gave us free admission





Albert Neutzell's last painting  
was done for the cover of his son's  
book, *IMAGES OF TOMORROW*.



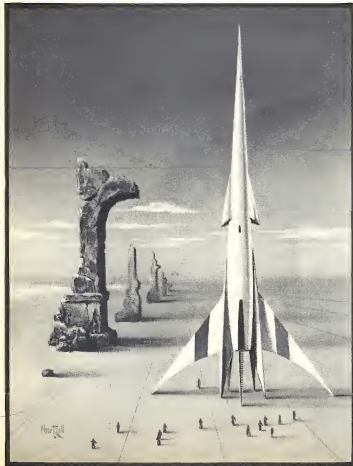
Neutzell's first cover, done for *Science Stories*.



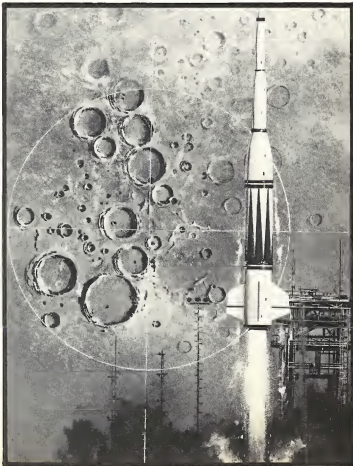
Surrealistic art was a Neutzell trademark in the 60's.



Perspective art added grace to Neutzell's spacecraft.



This NASA-like art was done many years before Apollo.



to movies, and many times, when Dad had to work late at night, my mother would take me to theaters—I must have seen almost every film produced in the late 30's and early 40's.) His job at Fox centered on making oil paintings to be hung in the lobbies as "ads" for the current film playing at the theater—now they use printed posters for the same purpose. During his free time he painted gallery art, and had showings in San Francisco, did movie ads for newspapers, and designed a series of small pamphlets for the California Missions. But beyond that and a few "faked" hard-cover jackets done later for motion picture title backgrounds (screen credits), he had little to prepare himself for magazine covers. It wasn't until the early 40's, during the beginning of World War II, after 10 years in San Francisco, that my parents moved south to Hollywood, where he worked for the motion picture industry until retiring almost 20 years later.

It was during the early fifties that Dad began experimenting in sci-fi cover art, a kind of "hobby" which was to pay-off far more than he had expected. Concerning this beginning, I'll quote from the autobiography published with his first cover in *SCIENCE STORIES* (Feb 1954), in which he wrote:

"Some people don't realize what it's like living with a science fiction fan in your house. Whether you like it or not, you quickly get educated to what *bems* are, or what *stf* means.

"But above all, you can't help getting a little interested in this growing field of imaginative fiction. If you are an artist, as I am, you find hundreds of wonderful pictures coming to mind.

"Of course it wasn't my idea alone to do cover work; the fact that my son decided to have some original cover illustrations—without paying the price required to purchase them at *stf* conven-

tions—had something to do with my first trying a hand at cover work. His continued prodding galvanized my already interested brain into action. Before long he was sending in sketches to the editors of this magazine . . ."

In the years that were to follow Dad made many more silk-screen prints, by the thousands—and thousands—did designs for dishes, and produced covers, a few of which are printed on these pages. His work has not only appeared in American magazines, but around the world. (Even now his work is being featured on European sci-fi magazines—evidence of which is a current copy of the Belgium "Apollo Science Fiction" magazine which we received just this week.)

In the last months of his life we were involved in putting together pocket books for a book publisher. The books were to have had at least 12 Nuetzell covers—the line was dropped after a year—if Dad's death hadn't aborted his efforts after the third book. Our concept was, at the time, to do the large oil paintings (wrap-around covers—actually works of art to hang), the originals to be given to the authors. The last cover he did for this line—and his last painting—was the picture that opens this feature for VERTEX, (used on my book "*Images Of Tomorrow*").

Between the first and last cover he managed to produce around 40 covers. It was a totally new thing for Dad in the beginning—much like a young talented artist starting out. But the years of experience in fine and commercial art paid off.

It didn't take long.

When he started sci-fi work, in the early 50's, it was considered impossible to break into the New York market from the West Coast—those three thousand miles make it a little difficult to step into the publisher's office upon request.

It was at first necessary to do sketches and send them out—cold. Finally one clicked with Ray Palmer, publisher of "*Science Stories*," but he wanted changes. Dad made them, and the finished product was published (here shown: the wrecked rocket with tiny space-suited men climbing out, with the swirling cloudy mass threatening them from above). He felt this first sale was only an accident and wouldn't repeat itself. But from that point on the only difficulty was getting Dad to settle down to do more covers between his other artistic projects.

Forrest "Forry" J Ackerman handled Dad's work from then on. Since that time Forry has gathered the largest collection of Nuetzell originals in existence.

By the mid 50's, Dad was getting assignments from such magazines as *Famous Monsters of Filmland*, *Amazing Stories*, *Fantastic Stories*, *Fantasy & Science Fiction*—along with pocket-book commissions from local L.A. publishers. A couple of covers were turned over to Robert Bloch, of "Psycho" fame, who had to develop stories around the artwork; years later, when the two men met, Dad remembered Bob telling him what a "headache" it had been to write the stories fitting those covers.

Strangely enough, though not being a sci-fi fan, he managed something which was, in the end, unexpected. Became what the editors of VERTEX felt represented a certain period, which spanned almost 20 years, a time that led to the real Space Age.

To me, personally, the final painting my father did—for "*Images Of Tomorrow*"—combines both his commercial and artistic talents in the very finest level. It was a final art statement—a perfect combination of what he stood for as an artist. It said it all. Al Nuetzell had, despite himself, become a true dreamer of tomorrow. ☉

Neutzell's art was never startling in design, but it was the first of the science fiction artwork, as opposed to illustration. He took pride in his work, and the many book covers he did showed that pride clearly.

# PATRON OF THE ARTS

from page 83

of glitter, millions upon millions of suns making a starry mist that wandered across the blackness.

The third side was another landscape, seen from a hilltop, with a red-violet sea in the distance and two moons.

The fourth side was darkness. A sort of darkness. *Something* was back in there beyond them. Vague figures formed, disappeared, reformed slightly differently, changed . . .

Then I appeared. I think it's me. I don't know *why* I think it is me. I have never told anyone I think one of the dim faces is me, but I believe it is.

The vibrations were subtle, almost unnoticed until you had looked at the cube a long time. They were peaceful vibrations, yet somehow exciting, as if the brainwave recordings upon which they were based were anticipating something marvelously different. There have been books written about this one cube and each writer has his interpretation.

But none of them saw the other cube.

It's a scenic view and it's the same as the third face of "The Lovers." If you walk around it it's a 360-degree view from a low hilltop. In one direction you can see the shore curving around a bay of red-violet water and beyond, dimly seen, are what might be spires or rock or possibly towers. In the other direction the blue-green waves in the gentle breezes towards the distant mountains. The cycle is long, several times longer than any present sensor, some thirty hours. But nothing happens. The sun rises and sets and there are two moons, one large and one small. The wind blows, the grass undulates, the tides come and go. A hot G-type sun. Moonlight on the water. Peaceful vibrations. Quiet.

Alone in that studio I touched the smooth glassite surface and it was unyielding, yet an alien world seemed within reach. Or was it? Had Mike's particle research opened some new door for him? I was afraid to have the Cube moved for perhaps, in some way, it was aligned.

You see, there are footsteps on the ground.

Two sets, and they start at the cube and go away, towards the distant spires.

I had my best team look it over. They went away with the diagrams and the notes they found on interdimensional space. They even had a set of some figures scribbled on a tablet.

Sometimes I plug into the monitor and look at the Cube sitting in the empty, locked studio, and I wonder.

Where are they?  
Where are they? ○

# WE ATE THE WHOLE THING

from page 63

pocketed the original screws and substituted the special ones there was a scratching from the air duct behind him. A red-painted hook at the end of a shining wire cable appeared and jerked to a stop. The timing was still right on. He pulled out his belt, which had been made with this special function in mind, and wrapped it around Mr. Trench's chest, just under his arms, with the buckle in the back. It took scarcely any effort to lift the small man into the shaft and to fit the hook through the buckle so he dangled there. Then he pushed down hard, twice, on Mr. Trench's shoulders; the strain gauge on the cable above would receive the signal. It did and the unconscious man rose swiftly out of sight—just as the beeping came from the front door. Jean-Paul turned the ornate ring he wore on his right hand so that the cheap vulgar stone was on the inside.

"Come in," he said, and Hardesty entered. "Close the door. Let me shake your hand and wish you luck."

"Why—" was all Hardesty had time to say before he fell. The poison had been purchased from a source in the U.S. Government Biological Warfare lab and it worked fast. He was a corpse before he hit the floor. Jean-Paul took off the man's belt, cheap plastic but it would be strong enough doubled and tripled. With it he lashed Hardesty's ankles together, wrapping it many times and knotting it securely. Getting the bulky policeman through the opening was harder than handling Mr. Trench had been, but he did it, slipped the hook between the ankles and gave the signal. This was taking a chance, but not a big one. They would be expecting him, not the corpse, but they were cool up there. The hook would be back for him. By the time it came he was in the duct, bracing against the sides to hold himself in position, and pulling the vent plate into position over the opening. The spring-loaded clamps held it as securely as the screws had before. He grabbed the hook with both hands, jerked hard twice, then swung free.

**A**fter this everything went just as it had in the training mockup. As soon as he had stepped out onto the rain-wet roof they began dismantling the lifting gear. His job was putting the inspection hatch back on, and this he did swiftly, finishing just in time to help manhandle the rig through the copter door. Salty was the last man in, closing the door as the engines started. Before he sat down they were lifting off.

"Smooth," Salty said, gasping, "but damn hot work down there. And why the hell did you bring the cop?"

"One chance in a million. He was a camera nut. I couldn't answer his questions."

"Anyone see it?"

"No."

"Then it's in the green. Two people vanish. Make it three. Nothing to trace to us. It's in the green."

"Who are you?" the hoarse voice gasped. "Why are you doing this?"

"Why Mr. Trench," Jean-Paul said, suddenly very weary. "Come-to just in time to say good-bye." Salty and the other two smiled at this.

"Why *me*? I don't understand," he moaned. "My commission will help people."

"It won't help the several large corporations who have employed us," Salty said. "They have a lot of money invested in industrial plants, and your revelations will cause trouble, expense, shut-downs. None of those things are very nice. But if you vanish completely it will be a mystery, and that will be the end of it. You are probably the last person who has the ability to head the Pollution-Despoilation Committee, so after you things will be smoother."

"After me things will be deadlier!" the little man screamed. "*I am* the last one for the job. The others are corrupt, take bribes—What are you doing? Don't you realize the world is going to hell? The human race is dying, drowning in its own pollution and excrement. . . ."

He stopped, gaping in astonishment, as they all burst out laughing. It was Salty who answered him, but the others nodded smiling agreement.

"Not going, Mr. Trench. Gone. No one cared enough. It's gone. We are just getting ours out of it."

"Over the ocean now," the pilot called down through the hatch.

They swiftly wired Mr. Trench's legs to the engine block from a 1982 Dodge and hurled him, screaming of course, through the open door.

"Send the job-done signal," Salty called up to the pilot.

The response was terribly swift. As soon as the signal was received a switch was thrown by the man in top management, and the copter exploded instantly into flaming fragments.

In fact, the explosion was so strong that some of the fragments passed the still screaming Mr. Trench and hit the water before him, although perhaps he did not notice them, nor did he appear to care. ○

finally. "Whatever you've got."

"You still do not believe me," said the traveler. "Not yet, anyway, but you will." He uncrossed his extensipods and slid closer to the pool.

**S**uppose, Brother Morisel," he began. "Suppose that time is analogous to a current. I imagine you are at least vaguely familiar with the concept?"

"More or less. Sunday supplement stuff."

"Indeed. But the image of time as a river is essentially accurate. It is a flow which contains certain points that are crucial to the past and future. These dates are like forks in a current; they are points when history may have alternative destinies. Sometimes these circumstances can be manipulated."

Morisel listened attentively. He drew another skull on the gell pad.

"It is because of a critical fork approaching in your time-stream that I was chosen by my colleagues to travel here," the man continued. His voice rasped harshly. "This, you see, is an experiment—a trial born of desperation. The approaching split in the time-stream, is critical. My mission is to influence its direction, to utilize any means so that your people follow one certain branch of the divergence."

"It sounds ambitious," said Morisel. "Perhaps it is impossible. My colleagues and I have never before tried such an experiment. Interference, with the attendant paradoxes, could prove dangerous for all the alternate futures."

"So why this one now?" asked Morisel. His notepad displayed the silhouette of a sandclock superimposed on the skull.

"Desperation. This approaching point of divergence is utterly crucial to mankind's future. It is imperative that my efforts ensure the choice of a certain path—and deny existence to the other possibility. This is my mission—to make sure that your people take the better of two possible courses."

Morisel realized he was beginning to lose a measure of his skepticism. The stranger's voice, for all its stilted syntax, struck a premonitory chord. The newsman's tentacles began to widen the lines of the skull.

"Let me describe a possible future awaiting you, Brother Morisel. One of the problems receiving much popular attention in this time is the pollution of our natural environment; correct?"

Morisel registered agreement. "Ecology."

"That desperately vital balance between sentient being and this planet is about to break down. You have hesitated too long. The rape of your world should have been interrupted long before."

Morisel started to speak, but his visitor waved an extensipod. "Please hear me out. Air and water, all are irreparably poisoned. Unnamed terrors are about to ride the planet. The tiny diatoms will die first. Then the smaller beings, the plants, finally yourselves. There will be oases of a fashion, for a while. Then the scramble for life will pit bands of survivors against each other. Thermo-nuclear weapons, poisons, bacteriological bombs will be used. It will be madness."

"There will be nearly no life left on a virtually sterile world. If ever a similar civilization rises, it will not be for hundreds of millions of years. That is how far ahead our probability scanners can operate. The world will remain a bleak cinder."

Morisel was shaken by the conviction in his visitor's voice. The portrait of civilization's self-destruction had been suitably graphic. "Consider," he said, "if you're from the future, then you must be from the other branch of our time-stream where life evidently wasn't wiped out. Is that our other choice—your own future? Is that our chance to avoid the world's destruction?"

The man opened his beak, then paused. A silver glow began to surround his body and the amorphous lines of his form wavered.

"I am sorry, Brother Morisel." The words seemed to come from a great distance. "I fear my power resources are more greatly depleted than I realized; I can no longer maintain the mask." The nimbus intensified and deepened to a mirror-bright haze obscuring the stranger from Morisel's fascinated gaze.

Then the luminous mist vanished and Morisel looked upon his visitor's actual face.

"Do you really want to know what the other path is?" asked the being. "The tale I have already told you is the one that I am working with all dedication to bring into reality; your final, total suicide is the optimistic view. Are you sure you want to hear the other alternative, the pessimistic choice?"

Morisel stared at the matted hair, the clumsy anthropoid form reared erect on its hind limbs. He didn't answer. He began to scream. ○

any species.

Then that universe would not change.

Now assume that there is an inertia to history; that the past tends to remain unchanged; that probabilities change to protect the fabric of events. What is the simplest change in history that will protect the past from interference?

Right. No time machines!

**NIVEN'S LAW: IF THE UNIVERSE OF DISCOURSE PERMITS THE POSSIBILITY OF TIME TRAVEL AND OF CHANGING THE PAST, THEN NO TIME MACHINE WILL BE INVENTED IN THAT UNIVERSE.**

**I**f time travel is so manifestly impossible, why does every good and bad science fiction writer want to write a new, fresh time travel story?

It's a form of competition. No writer believes that a field is completely mined out. And no field ever is. There is always something new to say, if you can find it.

Time travel can be a vehicle, like a faster-than-light drive. Our best evidence says that nothing can travel faster than light. Yet hard-headed science fiction writers constantly use faster-than-light spacecraft. If a character must reach the Veil Nebula, and if the plot demands that his girl friend be still a girl when he returns, then he must needs travel faster than light. Similarly, it takes time travel to pit a man against a dinosaur, or to match a modern man against King Arthur's knights.

There are things a writer can't say without using time travel.

Then, time travel is so delightfully open to tortuous reasoning. You should be convinced of that by now. The brain gets needed exercise plotting a story in a universe where effects happen before their causes; where the hero and his enemy may be working each to prevent the other's birth; where a brick wall may be no more solid than a dream, if one can eliminate the architect from history.

If one could travel in time, what wish could not be answered? All the treasures of the past would fall to one man with a submachine gun. Cleopatra and Helen of Troy might share his bed, if bribed with a trunkful of modern cosmetics. The dead return to life, or cease to have been at all.

Bothered by smog? Henry Ford could be stopped in time, in time . . .

No. We face insecurity enough. Read your newspaper, and be glad that at least your past is safe. ○



# THE DANCE

from page 33

*"Somewhere inside those clouds was what was left of the elements which had comprised seventeen human beings, who were vapor now."*



scious, almost random acts which even non-living energy can perform. And when all parts had been completed precisely correctly and at just the right time and in just the right sequence, the Creating took place.

It was a foodbeast. It formed and took shape before them in the void, and grew and glowed its dull, drab glow until it was whole. For a moment it drifted there, then suddenly it was expelled from the vortex, thrown out violently as though from an explosion—away from the nothingness within, away from darkness and silence into the crashing, whipping violence of the storm outside. And with it went the Three, vomited forth with the primitive bit of life they had made.

Outside, in the storm, the Three went automatically into their tightest motion-sequence, whirling and blinking around each other in desperate striving to maintain themselves amid the savagery that roiled around them. And once again they felt the powerful pull of the vortex behind them, gripping them anew now that they were outside, and they knew that the vortex would draw them in again, this time forever, unless they were able to resist it. But they found that they were nearly spent; they had lost more of themselves in the vortex than they had ever imagined possible. They hardly felt alive now, and somehow they had to withstand the crushing powers of both the storm and the vortex, and had to forge such a strongly interlinked motion pattern that they would be able to make their way out of this place, back to calm and safety.

And there was only one way they

could restore themselves enough for that.

Moving almost as one, they converged upon the mindless foodbeast they had just created, and they ate it.

That's not precisely the end of the Dance of the Changer and the Three—it does go on for awhile, telling of the honors given the Three when they returned, and of Minnearo's reaction when he completed his Change by reappearing around the life-mote left by a dying Windbird, and of how all of the Three turned away from their honors and made their next Changes almost immediately—but my own attention never quite follows the rest of it. I always get stuck at that one point in the story, that supremely contradictory moment when the Three destroyed what they had made, when they came away with no more than they had brought with them. It doesn't even achieve irony, and yet it is the emotional highpoint of the Dance as far as the Loarra are concerned. In fact, it's the *whole* point of the Dance, as they've told me with brighter sparkings and flashes than they ever use when talking about anything else, and if the Three had been able to come away from there *without* eating their foodbeast, then their achievement would have been duly noted, applauded, giggled at by the Newly-Changed, and forgotten within two life-cycles.

And these are the creatures with whom I had to deal and whose rights I was charged to protect. I was ambassador to a planetful of things that would tell me with a straight face that two and two are orange. And yes, that's why I'm back

on Earth now—and why the rest of the expedition, those who are left alive from it, are back here too.

If you could read the fifteen-micro-tape report I filed with Unicentral (which you can't, by the way: Unicentral always Classifies its failures), it wouldn't tell you anything more about the Loarra than I've just told you in the story of the Dance. In fact, it might tell you less, because although the report contained masses of hard data on the Loarra, plus every theory I could come up with or coax out of the minicomp, it didn't have much about the Dance. And it's only in things like that, attitude-data rather than I.Q. indices, psych reports and so on, that you can really get the full impact of what we were dealing with on Loarr.

After we'd been on the planet for four Standard Years, after we'd established contact and exchanged gifts and favors and information with the Loarra, after we'd set up our entire mining operation and had had it running without hindrance for over three years—after all that, the raid came. One day a sheet of dull purple light swept in from the horizon, and as it got closer I could see that it was a whole colony of the Loarra, their individual colors and fluctuations blending into that single purple mass. I was in the Mountain, not outside with the mining extensors, so I saw all of it, and I lived through it.

They flashed in over us like locusts descending, and they hit the crawlers and dredges first. The metal glowed red, then white, then it melted. Then it was just gas that formed billowing clouds rising to the sky. Somewhere inside those clouds was what was left of the elements which had comprised seventeen human beings, who were also vapor now.

I hit the alarm and called everyone in, but only a few made it. The rest were caught in the tunnels when the Loarra swarmed over them, and they went up in smoke too. Then the automatic locks shut, and the Mountain was sealed off. And six of us sat there, watching on the screen as the Loarra swept back and forth outside, cleaning up the bits and pieces they'd missed.

I sent out three of my "eyes," but they too were promptly vaporized.

Then we waited for them to hit the Mountain itself . . . half a dozen frightened men huddled in the comp-room, none of us saying anything. Just sweating.

But they didn't come. They swarmed together in a tight spiral, went three times around the Mountain, made one final salute-dip and then whirled straight

# DEADLY INVASION

from page 57

up and out of sight. Only a handful of them were left behind out there.

After awhile I sent out a fourth "eye." One of the Loarra came over, flitted around it like a firefly, blinked through the spectrum, and settled down to hover in front for talking. It was Pur—a Pur who was a thousand million billion life-cycles removed from the Pur we know and love, of course, but nonetheless still pretty much Pur.

I sent out a sequence of lights and movements that translated, roughly, as, "What the hell did you do that for?"

And Pur glowed pale yellow for several seconds, then gave me an answer that doesn't translate. Or, if it does, the translation is just, "Because."

Then I asked the question again, in different terms, and she gave me the same answer in different terms. I asked a third time, and a fourth, and she came back with the same thing. She seemed to be enjoying the variations on the dance; maybe she thought we were playing.

Well. We'd already sent out our Distress call by then, so all we could do was wait for a relief ship and hope they wouldn't attack again before the ship came, because we didn't have a chance of fighting them—we were miners, not a military expedition, and god knows what any military expedition could have done against energy-things anyway. While we were waiting, I kept sending out the "eyes," and I kept talking to one Loarra after another. It took three weeks for the ship to get there, and I must have talked to over a hundred of them in that time, and the sum total of what I was told was this:

Their reason for wiping out the mining operation was untranslatable. No, they weren't mad. No, they didn't want us to go away. Yes, we were welcome to the stuff we were taking out of the depths of the Loarran ocean.

And, most importantly: No, they couldn't tell me whether or not they were likely ever to repeat their attack.

So we went away, limped back to Earth, and we all made our reports to Unicentral. We included, as I said, every bit of data we could think of, including an estimate of the value of the new elements on Loarr—which was something on the order of fifty times the wealth of Earthsystem, with royalties from Orion thrown in for lagniappe. And we put it up to Unicentral as to whether or not we should go back.

Unicentral has been humming and clicking for ten months now, but it hasn't made a decision. ○

guttural noise seemed to be coming from the next room down the hall. Approaching the doorway, Bob noticed a pungent odor permeating the air in front of the room.

His hands sweated freely.

He looked into the room.

A large caldron, the size of a metal garbage can, squatted in the middle of the small room. Sort of a study. The kettle brimmed with the odorous fluid. The guttural sound was the slow, even bubbling of the thick mixture. Heat for the caldron was provided by a large electric "hot plate," approximately three feet in diameter.

Finally, Bob was able to take his eyes off the strange container of steamy liquid. The walls of the study were lined with bookshelves. A massive mahogany desk practically filled up the east wall. A narrow shaft of sunlight streamed in through a small window just above the cluttered desk top.

Bob crossed the room in three, long, hurried strides. Stepping behind the desk, he saw the open book in front of him. Apparently it was some sort of diary or journal. Several handwritten entries were visible. Gazing at the rows and rows of books, Bob realized that over half of the books had the identical blue-and-beige binding.

Could all of these look-alike books (there were hundreds) be journals?

Bob crossed the room again, stepping around the caldron. Pulling one of the books from a shelf, he flipped through it. All handwritten. He slipped another one from a lower shelf. All handwritten.

Bob had been so caught up in the number of books with the same type of cover he hadn't noticed that each book was labeled. Reading the label on the book he was holding, he almost dropped it. The bold, block letters spelled out "MARS-1971".

Damn it! He'd been right. They were aliens.

Bob felt weak. His knees began to buckle. Taking the retrieved journal with him, he made it behind the desk again and plopped into the deeply-cushioned black leather chair.

For several minutes the shock clung to him like early morning fog on a road. Finally, he was able to collect his wildly darting thoughts and, once again, look at the book. He opened it to the first page and read, "Man is a strange creature. He seems to live with so much reckless abandon, with no deep concern for tomorrow. But, if his back is against the wall and he is forced to do battle, he will fight for the life he seems to take

so light—"

The blast of a car horn out on the suburb street startled Bob. He listened for any other noises. Nothing.

He continued reading, "Man's body is a fragile structure, able to be penetrated by a variety of fatal organisms known to us. Sometimes death is a speedy process; sometimes the pain and agony is drawn out for what seems to be eons."

Bob slammed the book shut.

"So that's how they plan to do it. Bacteria. Probably released in our air, in our water or in our foods. I've got to tell somebody!"

He bolted from the leather desk chair. But, as he was standing up, his eyes focused on a word written in the book that had been open on the desk top when he had first entered the room. The word was "failed."

Pushing aside the book he had taken from the shelf, Bob eased back into the cushions of the chair. He read the entire last sentence of what was apparently the most recent entry in the journal: "Everything tried has failed."

Flipping the book over, Bob read the label "MARS-1972". He turned the book back over. Going back one page, he was able to find the beginning of the final entry.

"After eleven years of extensive treatment by the technicians and specialists at the Mississippi Atomic Research Site (MARS) no real progress has been made. The liquid compound developed during the experimentation at the site will prolong our life, but it, as the scientists surmised, is not a cure—only a stalling agent for the inevitable. Without the almost constant exposure to sunlight and electrical charge, and the solution to coat our bodies, we would shrivel and die within a matter of days. Even the cells of our eyes have been altered. The organism that has attacked us is too strong, too powerful. I can only pray that someday someone will find a cure, possibly some type of reverse procedure of the laboratory accident that caused the bacteria to invade my body. If only I had known about the exposure to the organism in time to prevent the members of my family from eating or drinking after me, they would not be contaminated now and have to be put through this day-to-day living hell."

Remembering the coffee he had sipped in the Carters' kitchen, Bob's eyes went wide-white. His screams split the late morning air.

The next morning, five chairs were side by side on the Carters' front lawn.

my tastes are high and low and in between. I love films like *Sunset Boulevard*, which I've seen 9 or 10 times. It's brilliant baroque-vulgar—it's a terrific experience. I would have loved to have written that screen play. *Some Like It Hot* I've seen 8 times. I love all the Bond films. I've seen each one of them at least 5 times. I tried, along with Charlie Beaumont, and Bill Nolen, and Dick Mathison, 15 years ago, to get Hollywood to make those into films. Everyone I'd bump into, I'd say "These books are good books. They'd be great fun. It's Fu-Man-Chu time, all over again." I'm not saying they're great, great books. I'm not saying they're brilliantly written; they're not. They're good books and a hell of a lot of fun and they make beautiful movies. And they're science fiction movies, every single one of them. No one has noticed, of course. They don't call Bond films science fiction movies, but that's what they are. They're science fiction adventures.

**VERTEX:** What about the films that have been labeled science fiction?

**BRADBURY:** We ought to mention *Fahrenheit* here, because I liked *Fahrenheit 451* very much. Truffaut did a fine job on that. I wrote him immediately, when I saw the film, and told him about those parts that didn't work. There's a soft section in the center there that doesn't hold up. There's so much good stuff and I love Oscar Werner. I think he is absolutely right for Montag. The ending on that film is one of the most beautiful endings on any film ever made. There are 2 or 3 comensurate endings. My favorite endings on motion pictures are the ending of *Citizen Kane*, of course, *Rosebud*. The ending of *Sunset Boulevard*, where Norma Desmond comes down the stairs and looks into the camera and asks for her close up, and then you fade out and it destroys you. You can have a bad motion picture with a brilliant ending, and you've got a good film. Conversely, you can have a brilliant motion picture with a bad ending and that works against you. People go out with this uneasy feeling that something hasn't worked. So, in the case of *Fahrenheit*, you have a good film, with a brilliant ending, which lifts the whole film. You go out with this feeling of having been transformed by Truffaut. It's his ending, not mine. You see, I'm talking about his ending. They were on location and it began to snow, and somebody said, "Well, let's shut up and go back to the studio." Truffaut, I gather, made the decision. He said, "No. We'll stay here and use the snow falling and it will

be even better." And he was right, 'cause it adds such wonderful flavor and sense of place and time, and eternity falling around them; when you say all these wonderful words and these walking metaphors move around and speak their words in the snow, and the film ends. I weep every time I see it.

**VERTEX:** What about *2001*?

**BRADBURY:** *2001* is the most gorgeous science fiction film, to look at, ever made. What a shame it doesn't have a screen play. I blame Kubrick for that. I told all of this to Arthur Clarke. We joke all the time about it, everytime he comes to town. He's seen the review I wrote for one of the Orange County magazines. I did some film reviews a couple of years ago for them. I think Kubrick is one of the worst directors in the world. He did a few good things at the start of his career, but he's gone steadily down hill. He doesn't know how to direct film; he doesn't know how to cut it anymore; he doesn't know how to do anything. He is a bore, and *2001* is boring most of the time. Visually, it's absolutely fantastic. Every time I look at it I just stand in awe. But that's not Kubrick, that's Doug Trumbull and all the people that worked with Doug Trumbull. So the film ought to have a new name on it: *Doug Trumbull's 2001*. I hope to get him to come over and help us work on our play, and help us with the special effects. Good God! Some of the boring scenes. Again, and again, and again all through *2001*—there's no excuse. There's one scene, I timed it one night—I've gone back 3 or 4 times—and I timed one of those scenes where they have a bunch of people sitting around a big, square table; press people and scientists. One of the major scientists gets up and makes an announcement about what they've found on Jupiter. It takes 7 minutes and that scene goes nowhere. They've got two pieces of information to give you and they could do that in two minutes and get on with the stuff that really is fun in that movie. When Hal kills off the three men who are in hibernation you don't know who any of those men are. The scene doesn't count. All they need is about five minutes, earlier in the film, to establish the identity of those men. Let me give you an example of what I'm talking about. This is a true story. Somebody came to Jack Warner, I believe it was—oh, this was 30 years ago—with a brilliant beginning for a film. There's a big chase with a police car; these gangsters running away; and they career through the streets and they knock people over, and, finally, at the

end, they dive off of a cliff and the car bounces all the way down and explodes. They shut off the projector and the lights come up and the director says, "Hey, wasn't that beautiful! Wasn't that beautiful!" And Jack Warner says, "Yeah, but who was in the car?" That's it. Who was in the car? Who cares? Who cares about those three guys in *2001*? I didn't give a damn. I didn't know them. Now you *should* care. That's what films, that's what all art is about. There's nothing new in this. It's old, old, old, and it's so important. If they had spent two minutes on each of those men, so we'd have heard their dreams: This is me; this is what I've been; this is my dream of the future. A few moments of truth. Then When Hal begins to destroy—Good God—you're going to go crazy. That scene should have shocked you right out of your seats. Instead, you sit there and you don't know any of those people. It's all beautiful and Hal's doing this thing and you don't give a damn. That's bad film making. I'm ashamed of Kubrick. And he's responsible; he's the director. It's not Arthur Clarke's responsibility, he didn't do that. Kubrick did it and he did it wrong.

**VERTEX:** Let's get off of film for awhile and let's talk about how you feel about science fiction and how it's helped man—or if it has helped man to adapt to his mushrooming technology?

**BRADBURY:** Oh, sure. God, look what's happened in the last five years in schools. It really is tremendously exciting. I'm sure I'm no different than any other writer in the world. I'm sure everyone gets mail. Arthur Clarke must get hundreds of letters a week, and Asimov and all the others. And so do I. They come from teenage kids, from the age of 11 and on up through high school, and college. There's been this burgeoning of science fiction in the schools, mainly brought about by the children themselves, and by the students in the higher grades who have taught their teachers. Because five years ago there were no courses being taught anywhere in the United States. Suddenly the teachers have caught on and the students have taught them. Usually by coming into class and saying to the teacher, "Hey here's a good story. Read it. Give it a chance, for Christ's sake. Don't turn it off." Because you have this intellectual snobbery which has collected around science fiction for 50 or 60 years and no one gave it a chance. It's all been sitting there, waiting to be discovered. So the kids sort of bullied their teachers. The teachers read it and said, "Hey,

"2001 is the most gorgeous science fiction film, to look at, ever made. What a shame it doesn't have a screen play. I blame Kubrick for that. He is a bore, and 2001 is boring most of the time."



that's pretty good. Story by Clarke; story by Asimov; story by Heinlein. Wonderful. God let's try some more." And then it began slowly to creep in the schools. Now every high school, every junior high, in the country has got some sort of science fiction thing going. I got a letter in the mail today; a class of 100 students selected *The Martian Chronicles* as just the top book. There was total agreement in the class. Now that's fantastic! So now, of course, we have thousands and thousands of books in print, whereas 22 years ago there were no books in print. It used to be an event, I remember, and I'm sure you do too, 22 years ago, if a science fiction hard-cover book was published in the United States. It was an event; you couldn't believe it. Someone actually printed a book you could buy for \$4.00—they didn't exist!

**VERTEX:** It was announced at the local science fiction clubs.

**BRADBURY:** Yeah, and they were usually by Vanity Press. Some are Vanity Press, like Gnome Press, but there were no Doubleday books in print; there were no Simon and Schuster books. Those all came along 22 years ago. Before that an occasional book; maybe 1, 2, 3 a year. Maybe something by Huxley, or something by R. C. Schera, or an occasional other writer, but certainly not from the science fiction groups. So, that's all changed. Now we have this tremendous thing happening in all the educational systems and all the colleges, where the sociology professors, and the psychology professors, and the political science people are using science fiction as a way

of rubbing up interest in their own fields; and it's so right. People like Alvin Toffler coming along and borrowing from all the science fiction authors and making his book. That's all that book is. He's borrowed all these ideas, which I resent. It's a non-book for me, because all these people did all the thinking, ahead of time, and they deserve all the credit. It's the Heinlein's of the world who have had these ideas that Toffler then borrows and puts in his book; it's the Clarkes who have changed the world, and all for the good. The effect is tremendous as teaching tools, as ways of getting non-readers to read. I have received hundreds of letters from all over the world, saying, "Thank God for science fiction because I have this boy who has never picked up a book in his life and we gave him Clarke or Heinlein or Asimov or one of my books, and the boy began to read." There's a reason, that dirty word, that tired word, *relevance*, which has been overused, but that's what it is. They want something that reflects their position in the middle of a technological revolution. They're going through it and that's why all of us write that way. How can you write any other way if you grow up inside of a culture like this? There's nothing else to write.

**VERTEX:** What do you see for the future of mankind? Can we survive the damage to our spaceship earth?

**BRADBURY:** Absolutely, absolutely. In fact, the papers today are full of news of the 25 billion dollars we're going to spend in the next few years to clean all of our lakes and rivers, and we'll do it. If we want to do it. We can do anything. I'm not a blind optimist, I'm a very pragmatic person, and I *know* we can do it. All we have to do is *say* that we will do it and get out there and get off of our ass and do it, that's all. Yes, we will survive. We will clean all of our streams and all of our lakes and all of our oceans in the next ten years, and we will find a way of producing a better gas and a better car, and save ourselves. We have to, that's all, we're going to be forced into it. That's good, being forced into it, on occasion.

**VERTEX:** And where do we go from there?

**BRADBURY:** The stars, of course. I'll be writing about that for the rest of my life: writing cantatas, and doing poems. I'd love to come back once every 100 years for the next 10,000 years, and watch 2001 come about. All the fabulous things we see in that film; we'll build them. We'll colonize the moon, we'll

create atmosphere, for ourselves and other worlds, and then we'll go off and live forever. And that's exciting, that's exciting!

**VERTEX:** I'd like to ask you how you personally feel about technology, your personal relationship with it. I understand that in the past you didn't like to ride in or drive automobiles.

**BRADBURY:** Well, I've never learned to drive. I'm not comfortable on freeways; but then, who is? I've tried to particularize. I'm not comfortable; I've never flown, but that's my own personal hang-up and it doesn't interfere with living, it's not that important. A thing has grown up over the years where people would say, "Well, he's against all machines and all technology." That's really severely misinterpreting what I've said in my books. I pick out very carefully those machines which afflict one, and attack them. For instance, if you're in a restaurant trying to eat dinner, and music by Musak is on too loud, the temptation is to squeeze a cat into the system. Right? That's what we'd all love to do. So I thought one day, why not squeeze a cat into the system? So I wrote the story *The Murderer*, about the guy who goes around scooping ice cream into radio sets, or into phonographs. It's a wonderful way of releasing tensions. We've all wanted to do this. The rest of the time that same machine is doing good work. If you can turn it on for yourself, if you can put on the symphonies you want to hear, and control the volume in the locations where you want to hear it. We had to fight the bus systems here a few years ago. They wanted to put on music and commercials, *sound*, and trap you on the buses with these things. I immediately got a little citizens group started to stop them from doing that. Same way with advertising on billboards—you can always look away from that, but you can't shut your ears when you're traveling. You can't have that trapped audience thing; you can't have George Orwell time. That thing was defeated, sure enough. What you do is you pick the machines that you like and you encourage them, and you pick those that you hate and try to have them destroyed, or put out of functioning. I love motion pictures. They are a technological robot which repeats truths beautifully. I would say that the influences of motion pictures on the world are basically good, excellent, most of the time. It's hard to point to a machine with as good a history of repeating certain kinds of truths which we want

/turn the page

to have repeated for ourselves, so that we remind ourselves of our basic humanity. If that machine begins to malfunction, then you criticize it. If you sense violence becomes an end to itself in films, then you speak up on this. VERTEX: Do you feel that mankind is maturing, that we are going to get rid of our violence, or are we going to take it to the stars with us?

BRADBURY: Oh, of course we will. One mustn't kid oneself. I'm not that kind of starry-eyed idealist, and never will be. You're going to suffer a severe case of disillusionment if you expect this. We are this fantastic concoction of things, we human beings, aren't we. Satan, devil; the mean-spirited and the glorious, at the same moment. It will always be this; that's not going to change. Our problem all along the way is to remain humane, if we can. To find out what a human being is. We're still a mystery to ourselves. We don't know anything about our genesis. We can make plans for the future. . . . So we'll take all of these things along. I accept this; that's paradoxical. That's very important that we know this, then we can accept ourselves. Then the chances of hurting one another will be much smaller. As long as we accept our capacity for evil. I think that's the first thing that we have to teach all the generations to come, including this one, is their capacity for evil, too. And no one should feel that they're above the ability to murder, to destroy, because we all have this thing. As soon as you lose that vision of yourself as possibly evil, then you can do all, all of evil. This was what Hitler was able to convince himself of; that he was a good man, that all of his motives were pure, that he was out to change the world for nothing but good; which allowed him to destroy eight million Jews. Stalin, the same way. All the great evil-doers were puritans who look upon themselves as the right hand or the left hand of God. Anything they do, including killing their own people—Hitler at the last flooded the subways in Berlin and destroyed his own people. Stalin killed off three or four million of his own Russians, serfs, because he thought it was all right to do it in the name of communism. We get all these motivations from the left or the right, and I'm afraid of all of them. God deliver me from the puritans. You find them in all the big political parties, and you have to be careful. There's a puritan streak in McGovern that I don't trust. There's a puritan streak in Nixon, too. There was a self-righteous puritan streak in John-

son. Most power people—Kennedy. . . . Which makes it all right to go in and kill people in other countries. We see it in every country, in every person, and if we know this, then we can be prepared for it and we can make do with each other better. If every Jew really knew that every Arab was possibly good, as well as evil, it would be a better situation, wouldn't it? And if every Arab knew that about every Jew, then they could sit down. But it's that thing that says to you: that person over there is completely evil. Well, we know he's not. It's a lie, preposterous, we're all this combination. So if I were in control of educational futures I've often said that's the first thing I'd want to teach, all the way through school. To prepare children for their own frailties, from their own falling from grace. Quite often when we fall out of sight from ourselves we then take it out on others; if we fail ourselves, then we blame the world quite often. If we ourselves do something evil, then we push it on other people and we see the evil in them more clearly and then we begin to fasten on that thing and then we destroy them, so we don't have to look at ourselves.

VERTEX: What would you like to say to all those kids that write you letters all the time?

BRADBURY: Do the things that you love. That's an old message from me, but I've had a good life because I started when I was 12 doing the things that I love to do, which was writing, and drawing, painting, acting. I've had many careers, the most successful of which is in writing. But I've been writing poetry now, for 35 years, without anyone paying me to do it. I did it because I loved it. Now, very late in time, some of it is getting good and I'm beginning to publish it. But no one paid me to do it. I did it because I loved it. So there is one thing you want to get over again and again to people. That they're going to be alive one time, and there's only one chance to be in love; so, for God's sake, pick something that's exciting to you. It doesn't matter how small it is; it doesn't have to be a big thing; it doesn't mean you have to be successful with a capital S. Joyful with a small j, yes, indeed, and love with a small l, which will fill your life. Do that and you can't go wrong. You may not wind up rich or famous or anything like that, but I know shoemakers who have very good lives. They love making a good shoe. God, this is old advice but it still works. That is the one constant I would like to leave with this generation. ○

char away and prevent the heat from damaging the hull. Eventually the orbiter's speed drops below that of sound and the pilot can fly it the same as he could a large glider. He lowers the tricycle-type landing gear and sets it down on a normal airport runway either near Cape Kennedy, or near the other launching site, Vandenberg Air Force Base in California.

Minor maintenance and replacement of the ablative tiles are all that is required to prepare the orbiter for its next launch two weeks hence. NASA figures that it can make the shuttle pay its way and return a ten percent profit on the investments by making 512 flights over a twelve year period, or about 40 flights annually. Each flight has a ten million dollar price tag, and space agency officials say the shuttle would break even if the payload was only two-thirds full which is about the same ratio the commercial airlines employ. They like to point out that the low launch costs will "open up the sky," enabling organizations with an interest in space and astronautics but without the enormous funds to participate so far to get into the act. Colleges and universities, small research companies and many industries could afford to launch satellites and conduct space experiments using the low-cost shuttle.

Others are not convinced. The shuttle program has been under constant criticism since the day of its inception, and Congress is split down the middle between those who feel the shuttle's \$5.2 billion cost is a shaky investment, unlikely to pay for itself, and those who support the high initial price balanced against a lower overall expenditure. In the years immediately ahead, as NASA requests for shuttle funding mount, the split will undoubtedly widen further, and yet both sides realize that the means must be found to make space transportation more economically sound.

Somehow the way will be discovered. One of the sharpest of the space-watchers, Arthur C. Clarke, noted that the price of spaceflight has diminished since the days of Sputnik and, "... the cost of space travel will continue to decline. A decade ago it was preposterous; today it is merely exorbitant. In a few years it will be extravagant—by the end of the century, no more than expensive. And in the early 2000's, flight between earth and moon will be an ordinary commercial operation."

Phileas Fogg would be pleased by that. ○



## ORGAN DRAFT

from page 45

syphilis. He was overruled by the medical officer in charge, who observed that the VD cases could be restored to active duty more quickly, if treated; besides, if they remained untreated they served as vectors of further infection. Therefore, he gave them the penicillin and left the wounded groaning on their beds of pain. The logic of the battlefield, incontrovertible, unassailable.

**T**he great chain of life. Little creatures in the plankton are eaten by larger ones, and the greater plankton falls prey to little fishes, and little fishes to bigger fishes, and so on up to the tuna and the dolphin and the shark. I eat the flesh of the tuna and I thrive and flourish and grow fat, and store up energy in my vital organs. And am eaten in turn by the shriveled wizened seniors. All life is linked. I see my destiny.

**I**n the early days rejection of the transplanted organ was the big problem. Such a waste! The body failed to distinguish between a beneficial though alien organ and an intrusive, hostile microorganism. The mechanism known as the immune response was mobilized to drive out the invader. At the point of invasion enzymes came into play, a brush-fire war designed to rip down and dissolve the foreign substances. White corpuscles poured in via the circulatory system, vigilant phagocytes on the march. Through the lymphatic network came antibodies, high-powered protein missiles. Before any technology of organ grafts could be developed, methods had to be devised to suppress the immune response. Drugs, radiation treatment, metabolic shock—one way and another, the organ-rejection problem was long ago conquered. I can't conquer my draft-rejection problem. Aged and rapacious legislators, I reject you and your legislation.

**M**y call notice came today. They'll need one of my kidneys. The usual request. "You're lucky," somebody said at luncheon. "They might have wanted a lung."

**K**ate and I walk into the green glistening hills and stand among the blossoming oleanders and corianders and frangipani and whatever. How good it is to be alive, to breathe this fragrance, to show our bodies to the bright sun! Her skin is tawny and glowing. Her beauty makes me weep. She will not be

spared. None of us will be spared. I go first, then she, or is it she ahead of me? Where will they make the incision? Here, on her smooth rounded back? Here, on the flat taut belly? I can see the high priest standing over the altar. At the first blaze of dawn his shadow falls across her. The obsidian knife that is clutched in his upraised hand has a terrible fiery sparkle. The choir offers up a discordant hymn to the god of blood. The knife descends.

**M**y last chance to escape across the border. I've been up all night, weighing the options. There's no hope of appeal. Running away leaves a bad taste in my mouth. Father, friends, even Kate, all say stay, stay, stay, face the music. The hour of decision. Do I really have a choice? I have no choice. When the time comes, I'll surrender peacefully.

**I** report to Transplant House for conscriptive donative surgery in three hours.

**A**fter all," he said coolly, "what's a kidney?" I'll still have another one, you know. And if that one malfunctions, I can always get a replacement. I'll have Preferred Recipient status, 6-A, for what that's worth. But I won't settle for my automatic 6-A. I know what's going to happen to the priority system; I'd better protect myself. I'll go into politics. I'll climb. I'll attain upward mobility out of enlightened self-interest, right? Right. I'll become so important that society will owe me a thousand transplants. And one of these years I'll get that kidney back. Three or four kidneys, fifty kidneys, as many as I need. A heart or two. A few lungs. A pancreas, a spleen, a liver. They won't be able to refuse me anything. I'll show them. I'll show them. I'll out-senior the seniors. There's your Bodily Sanctity activist for you, eh? I suppose I'll have to resign from the League. Goodbye, idealism. Goodbye, moral superiority. Goodbye, kidney. Goodbye, goodbye, goodbye.

**I**t's done. I've paid my debt to society. I've given up unto the powers that be my humble pound of flesh. When I leave the hospital in a couple of days, I'll carry a card testifying to my new 6-A status.

Top priority for the rest of my life.  
Why, I might live for a thousand years.

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## VERTEX REVIEWS

from page 12

forces and the Doms they run amok when their leaders are destroyed, urinating and defecating uncontrollably, killing each other, even beating at themselves, mindlessly.

Potentially, *The Iron Dream* is a satire. Hitler's Fatherland carried to extremis. But it fails. It is only one half of a good book. The first half describing Feric Jagger's meteoric rise to power, describing the society which followed the Time of Fire, even describing the genetic mishaps in all their loathsome detail; that part succeeds. But the author allowed his portrayal of obsession to obsess him as well. As Jagger engages the Doms in a seemingly endless series of battles the book degenerates into an exposé of a twisted mind, supposedly Hitler's. Over and over, the scenes of battle are detailed in stomach turning prose that, through its simplistic repetition, loses its impact and becomes merely boring. The intent is clear: supposedly this is Hitler's book and this fascination with gruesome gore is meant to tell the reader that the "author" is a sick man.

To write this book, Mr. Spinrad immersed himself in Hitler's works. He read all that the man had written, even transcripts of his dinner speeches. Perhaps he was infected by the material and, in an attempt at catharsis, went too far.

I was very disappointed in this book. I have been a reader of Mr. Spinrad's books for several years, and a great admirer of his talents, both as a writer and as a visionary. *Bug Jack Barron* was a beautiful book, superbly written, and *The Last Hurrah of the Golden Horde*, a collection of his short stories, repeated that success. But even Mr. Spinrad's lyrical style suffers in *The Iron Dream*, and he descends to clichés and repetitions. It is a shallow book, lacking in power and drive. It must have been difficult to write. To have to involve himself in so much evilness must have been very unpleasant for Mr. Spinrad. Unfortunately, it is also unpleasant for the reader.

He does attempt to salvage and explain the book in an afterword. To fully go into it would be revealing the end, and I despise reviewers who do that. Suffice it to say that I feel the afterword would have been a better foreword. Then the reader would have been forewarned, and maybe even the battle scenes would have had some significance, besides just being stomach churning.

I look forward to Mr. Spinrad's next book. I will try to forget this one. It gave me Nightmares instead of Dreams. ○



HEINLEIN  
from page 49

ture—had some connection in their ancestry with the Fillyloo Bird. I think you know the fillyloo bird: He flew backwards because he didn't care where he was going but he liked to see where he'd been . . .

I'm going to cut this short now. I do want to mention, however, the fashion in which the scientific method—just the matter of observing what goes on around you, observing it through your own eyes instead of taking other people's opinions, reserving your judgments until you have enough data on which to make a judgment—can be of real use to you even now, quite aside from any possible worse period in the history . . . in coming history.

I mentioned that it can keep your teeth from getting knocked in; that's an important point. It can because you'll stay out of controversies and out of arguments that you would otherwise get into. If you are talking with a man who obviously does not bother to use the scientific method or does not know how to use the scientific method in his everyday life, you'll never get into an argument with him—you'll know better, you'll know there's no point in an argument with him, that you cannot possibly convince him. You can listen—and you'll get some new data from him—and you'll be better able to predict thereafter, if on no other point than the fact that you'll be better able to predict what his reactions will be.

There are other advantages, in the way of keeping yourself cooled down, so you can be a little happier. For example, a man who uses the scientific method cannot possibly be anti-Semitic. I have made that an illustration because it's caused a lot of trouble in the world lately. Why can't he be anti-Semitic? For a very simple reason: He doesn't have enough data, consequently he hasn't formed an opinion. No matter how long he lives

he can't possibly know all Jews, and unless he knows all Jews he can't hate all Jews, because he doesn't form an opinion unless he has data. It is possible for him to hate an individual Jew as it's possible for him to hate an individual Irishman or Rotarian or man or woman or so forth. Possible—not as likely as it is with other people, because a person using the scientific method deliberately delays his reactions.

But he can't possibly be anti-Semitic. He can't hate all Capitalists; he can't hate all Unions; he can't hate all women; you can't be a woman-hater, not if you use the scientific method, you can't possibly—you don't know all women . . . you don't even know a large enough percentage of the group to be able to form an opinion on what the whole group may be!

By the same reasoning, it's very difficult for him to hate at all; and if you can just manage to keep hate out of your life (or a goodly portion of it—I can't keep it *all* out of my life myself, I've got to sit down and whip myself about the head and shoulders to get myself calmed down at times) . . . but you can help yourself with this method. If you can keep hate out of your life you can keep from getting your teeth knocked in. You can keep out of a lot of difficulties and take care of yourself in a better fashion.

A man with the scientific method cannot possibly believe that all politicians are crooks, for he knows that one datum destroys the generalization. I'll give one datum on that point: Senator George Norris; whether you like him or not the man's a saint on earth. Whether you agree with his opinions or not, he's not . . . a bad man.

And because he's never entirely certain of his own opinions on any subject, a man using the scientific method stays out of arguments, keeps himself from the emotional upsets that cause you to lose sleep and upset your stomach and get you such things as herpes and—oh, I'm not an MD, but there are plenty of functional disorders that a man can avoid, can very well avoid.

But there's a rough picture of the scientific man in everyday life. Such a man stands a better chance of living thru our period to a ripe and happy old age, in my opinion.

But I wish to make plain that the use of the scientific method does not depend on any formal education in science. It is an attitude and a point of view and not a body of information. You need have no formal education at all to use the scientific method in your everyday

life, all the time. I am not disparaging the body of scientific information that has been gathered by specialists or the equally enormous body of historical and sociological data that is available. Unfortunately, we can't get very much of it. But you can still use the scientific method, whether you've had a lot of education or not, whether you've had time to gather a lot of personal data or not.

But with respect to the acquisition of scientific training, I've heard people—oh, I've heard around fan clubs the remark that "I wish I knew something about mathematics" or "I wish I understood something about physics." The complaints that they're not fully appreciating some of the stories because they don't have enough specialized information. Or they've . . . some subject was too hard, or they weren't able to go far enough in school. I greatly sympathize with that. Uh, I'm not trying to play it down, anything of the sort, it's very much of a regret to me that I'm not at least twins and preferably triplets, so that I could have time to study the various things that I'm interested in; and I know that a lot of you have felt the same way, that life is just too—not too short, but too narrow.

We don't have room enough, time enough, to get around and learn all the things that we want to, and it is almost impossible for us to get a full picture of the world.

Surprising, the data that actually is available. God knows that no one can even hope to cover even a small corner of the scientific world these days. I think there's a way out of the dilemma, however; a fair one for us and a better one for our children. It's by the creation of a new technique to cover just that purpose. Men who might be considered encyclopedists, or interpreters—synthesists, I like to call them—men who make it their business to find out what it is the specialists have learned and then relay it to the rest of us in a consolidated form so that we can have, if not the details of the picture, at least the broad outlines of the enormous, incredibly enormous, mass of data that the human race has gathered. The facts behind us, the things that have happened before this moment, so that we can be better able to predict for ourselves, plan our lives after this moment.

There's only one synthesist who has really made such an attempt up to the present time, and I'm very pleased that it happens to be possibly the greatest of the science fiction writers: H. G. Wells. H. G. Wells perhaps didn't do a good

job of it—good lord! he didn't have a chance to, he had nobody before him, he did the pioneer work, he started it. But H. G. Wells in his trilogy—*"The Outline of History," "The Science of Life"* and *"The Work, Wealth and Happiness of Mankind"*—is so far as I know the only writer who has ever lived who has tried to draw for the rest of us a full picture of the whole world, past and future, everything about us, so we can stand off and get a look at ourselves.

It'll be done better in the future; nevertheless, it was a great work, the fact that he *did* it, that he tried at all. A wonderful work. And because he had done that kind of work, that he tried to do that kind of work for the rest of us, is the reason to my mind why his scientific fantasies are more nearly accurate in their predictions than those of, oh, myself, and various other commercial writers in the field. I don't know as much as H. G. Wells; I probably never will know as much as H. G. Wells; my predictions *can't* be as accurate.

But, after considering H. G. Wells' trilogy—*"Outline of History," "Work, Wealth and Happiness of Mankind"* and *"The Science of Life"*—it occurred to me that it would be amusing, to me at least, and I hope to you, for me to mention some books by assorted writers that, to a certain extent, help to fill in the gaps in the picture, and to a certain extent help to make up the lack of a broad comprehensive scientific education, which no one, not even ScD's and PhD's, can really have.

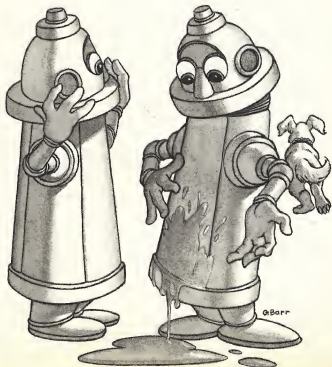
For example, in mathematics, is there one book that will help the non-mathematician, the person who hasn't specialized in it and made it his life work, to appreciate what mathematics is for? I've run across such a book; it's called *"Mathematics and the Imagination,"* by Kasner & Newman. You don't have to have any mathematical education to read it. To my mind it's a very, very stimulating book, very interesting book; and when you've finished reading the book, you at least know what the mathematicians are doing and why. Among other things you will discover—and this runs entirely contrary to our orthodox credoes—that mathematics is not a science. That mathematics is not a science at all; that it's an aspect of symbology along with the alphabet; that there is no such thing as *discovering* mathematics, for example. Mathematics is invented, it's an invented art, and has nothing directly to do with science at all, except as a tool. And yet you'll hear the ordinary laymen speaking time and

again of mathematics as a science. It just plain isn't because it has no data in it; purely inventions, every bit of it, even the multiplication tables. Yes, the multiplication tables:  $2 \times 2$  is 4 is an invention in mathematics, not a fact.

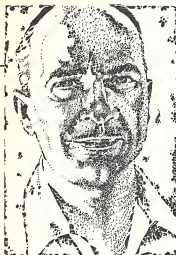
There are others such books. In physics, there is Eddington's *"Nature of the Physical World,"* I think one of the most charming books ever written, one of the most lucidly and brilliantly written books. It gives a beautiful background to modern physics. It's approximately 15 years old, so in order to cover a lot of the things that are currently being used for fiction in the science fiction field, you would need to supplement that. The book I got for my own purpose to supplement it—'cause you see, I'm not a professional physicist; I'm an engineer, but I'm not a physicist—to help bring it up to date, and I can tell you why I got the book. It's White's *"Classical and Modern Physics,"* published in 1940. It's about the latest book-bound thing on modern physics that I know of. There are later things in such publications as *Physical Review* and *Nature*; but this goes up to and including the fission of uranium—that sort of thing. It includes nuclear physics, and it delighted me to find that the author of this book thought

that rocketships would fly, and thought that very likely when we got around to it we'd find life on other planets. A very stimulating thing to get from a professional scientist, particularly in the field of *physical* sciences. I picked that book because White is an associate of Lawrence, in the nuclear laboratory at Berkeley. In other words, he is in on the ground floor, he is that McCoy, he knows what he's talking about. It's modern physics, 1940, the best up to that time.

So far as astronomy is concerned, I've never seen anything that surpassed, for a popular notion of the broad outlines of the kind of physical world that we live in, than John Campbell's series that appeared in *Astounding*. When did they start?—Julie Unger can tell us, I think (*from floor*: "1936")—ran on for 15, 16 issues, something of the sort, his articles on the solar system. I've always been sorry that Campbell didn't go on from there and cover stellar astronomy, galactic astronomy, and some of the other side fields. But even at that, anybody that's read thru that series by Campbell on the solar system will never again have a flat-world attitude—which most people do have. Not in the science fiction field, of course; I mean, not among fans of



"If it's a form of greeting, it's unique in the galaxy!"



**The author of more than thirty science fiction books, Heinlein is called, with reason, "The Dean Of Science Fiction Writers."**

science fiction.

(I speak many times here as if the human race were divided into two parts, as it *may* be—people who love science fiction and the people who don't—and I think you'll be able to keep sorted out which ones I'm talking about. I hope so. I get all tangled up. I do better on the typewriter. I hope.)

In the field of economics, an incomplete science but, nevertheless, one that you can't possibly ignore, I think the most illuminating book I've ever read is one by Maurice Colburn, called "*Economic Nationalism*." The title of it won't give any suggestion of what the contents are, but that's simply the tag by which it's known—Maurice Colburn's "*Economic Nationalism*."

Jim Farley's "*Behind the Ballots*" is probably as nice a job of recording actual data in politics as I've ever seen; however, politics—I'd never recommend that people read books in the political field. Go out and take a look yourself. Everything else you hear is guff.

I save for the last on that list of the books that've greatly affected me, that to my mind are the key books, of the stuff I've piled thru, a book that should head the list on the Must List. I wish that, I wish that everyone could read the book—it's just a wish, there aren't that many copies of it, everyone can't, nor could everyone read this particular book. All of you could, you've got the imagination for it. It's "*Science & Sanity*" by Count Alfred Korzybski, one of the greatest Polish mathematicians, when he went into the subject of symbology and started finding out what made us tick, and then worked up in strictly experimental and observational form from the preliminary work of E. T. Bell.

A rigour of epistemology based on E. T. Bell (*break in transcript here—some words lost*) . . . symbology of epistemology. Book refers to the subject of semantics. I know from conversation with a lot of you that the words epistemology

and semantics are not unfamiliar to you. But because they may be unfamiliar to some, I'm going to stop and make definitions of those words.

Semantics is simply a study of the symbols we use to communicate. General Semantics is an extension of that study to investigate how we *evaluate* in the use of those symbols. Epistemology is a study of *how* we know *what* we know. Maybe that doesn't sound exciting. It is exciting, it's very exciting. To be able to delve back into your own mind and investigate what it is you know, what it is you *can* know and what it is that you *cannot possibly* know is, from a standpoint of intellectual adventure, I think possibly the greatest adventure that a person can indulge in. Beats space-ships.

Incidentally, any of you who are going to be in Denver in the next 5 or 6 weeks will have an opportunity, one of the last opportunities, to hear Alfred Korzybski speak in person. He will be here at a meeting similar to this, at a meeting of semanticists from all over the world—oh, Maclean from Los Angeles, and Johnson from Iowa and Reisser from Mills College and Kendig and probably Hayakawa from up in Canada—the leading semanticists of the world—to hear Alfred Korzybski speak. I think starting Aug. 9, isn't it Missy? The early part of August. It'll be in the newspapers in any case. And it's much better to hear him speak than it is to read his books. He's limited by the fact that he's got to stick to the typewriter, to the printed word; but when he talks—when he talks it's another matter! He gestures, he's not tied down with his hands to the desk the way I am; he walks, stumps all around the stage, and waves his hands; and when he's putting quotation marks on a word he puts 'em on (*illustrates, audience laughs*) . . . and you really gather what he means. Incidentally—he looks like A. Conan Doyle's description of Prof. Challenger if Prof. Challenger had shaved the beard. Dynamic character. You may not like him personally, but he's at least as great a man as Einstein—at least—because his field is broader. The same kind of work that Einstein did, the same kind of work, using the same methods; but in a much broader field, much more close to human relationships. I hope that some of you will be able to hear him. I said that this will be one of the last chances, because the old man's well over 70 now; as he put it, "I will coagulate someday, I will someday soon, I will coagulate"—which is the term he uses for

dying. He speaks in terms of colloidal chemistry. Properly, it's appropriate. He won't last much longer; in the meantime he's done a monumental piece of work. He has worked out in methodology the same sort of important work that H. G. Wells did in the matter of description; and the two together are giants in our intellectual horizon, our intellectual matrix today, that stuck up over the rest like the Empire State Bldg.

I think that's about all that I had to say. Didn't say it too well nor too brilliantly. I'm tired and confused and nervous and quite frankly considerably stirred up by the fact that I was selected as Guest of Honor here. It embarrasses me and at the same time I enjoy it.

I started out to talk primarily about science fiction and I got off on some of my own hobbies. It's a luxury to me not to be held down by a plot and a set of characters. Here I can say anything that I like and, aside from this infernal recording machine, not be bothered.

I myself have been reading science fiction oh, I don't know, when did Gernsback start putting them in *Electrical Experimenter*? ("*1913*" from floor)—well, I've been reading about that long. And then I used to read it in *Argosy* and I dug up all that I could of that sort of thing out of the Kansas City Public Library. I could get cards from—every member of my family had a library card, and there were 7 of us, so I could bring home quite a number of books at one time (I wear glasses now as a result). And, never had any particular notion of writing it until about two years ago when a concatenation of peculiar circumstances started me writing it, and happened to hit the jackpot on the first one, so I continued writing. It amazed me to discover people gave money away for doing things like that—it beats working.

I don't suppose I'll be writing very much longer. Things shaping up the way they are, I'll probably have other things that I'll have to do, a lot of us here will have other things that we're going to have to do, whether we like it or not; and I may not come back to it; but I hope to be a fan of science fiction for at least another 50 years if I can hold myself together that long and keep from getting my teeth kicked in.

Well, all that I really personally want to do is hang around as long as I can, watch the world unfold, see some of these changes, see what the changes really are—that suits me.

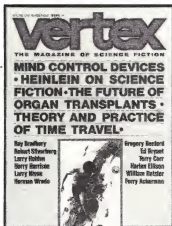
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